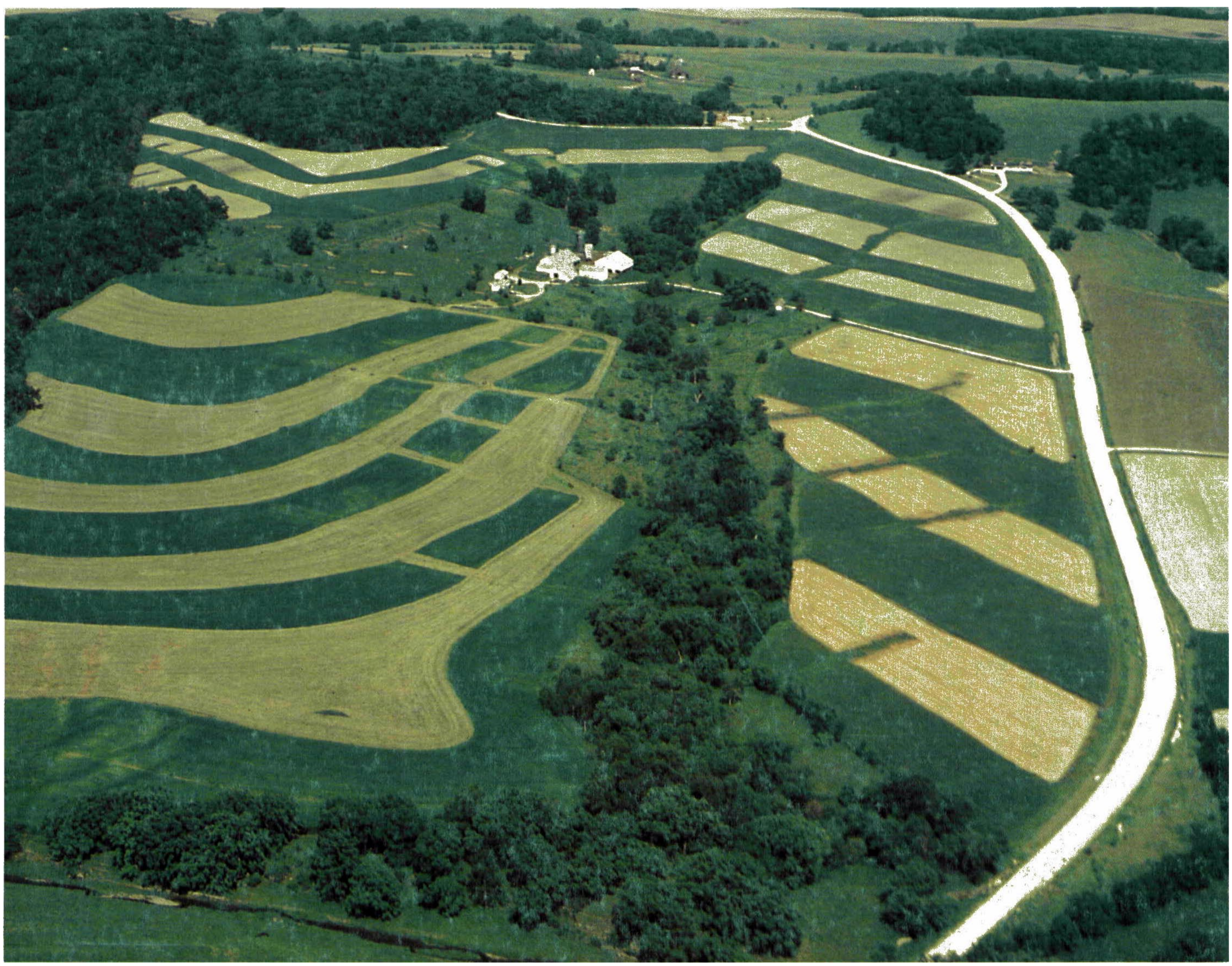
United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Jo Daviess County, Illinois



How To Use This Soil Survey

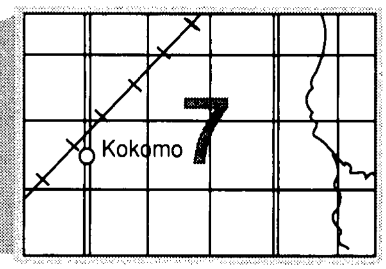
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

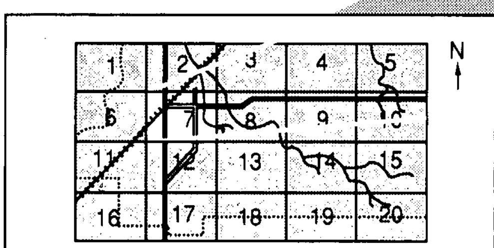
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



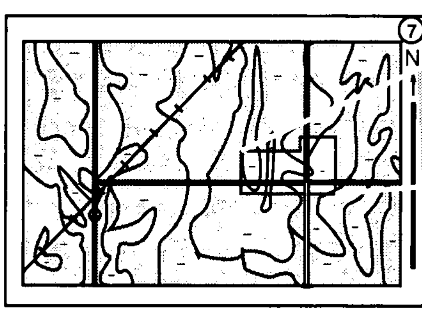
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

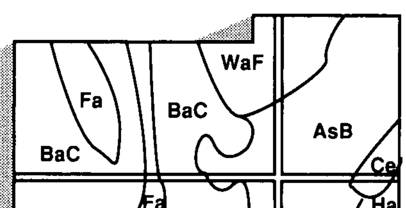


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Jo Daviess County Soil and Water Conservation District. The cost was shared by the Jo Daviess County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 145.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An area in Jo Daviess County where stripcropping and contour farming help to control runoff and erosion.

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Issued May 1996

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Jo Daviess County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow over bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Thomas W. Christenson
State Conservationist
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Soil Survey of
Jo Daviess County, Illinois

By R.A. Tegeler, Natural Resources Conservation Service

Soils surveyed by R.A. Tegeler, D. Grantham, and R. Schantz, Natural Resources Conservation Service, and E. Engel, L. Johnson, T. O'Connor, Jo Daviess County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Illinois Agricultural Experiment Station

JO DAVIESS COUNTY is in the northwest corner of Illinois (fig. 1). It has a total area of 395,985 acres. It is bordered on the west by the Mississippi River; on the northwest by Grant County, Wisconsin; on the northeast by Lafayette County, Wisconsin; on the east by Stephenson County, Illinois; and on the south by Carroll County, Illinois. In 1984, the population of the county was 23,300. Galena is the county seat. Other towns and villages in the county are Apple River, East Dubuque, Elizabeth, Hanover, Nora, Seales Mound, Stockton, and Warren.

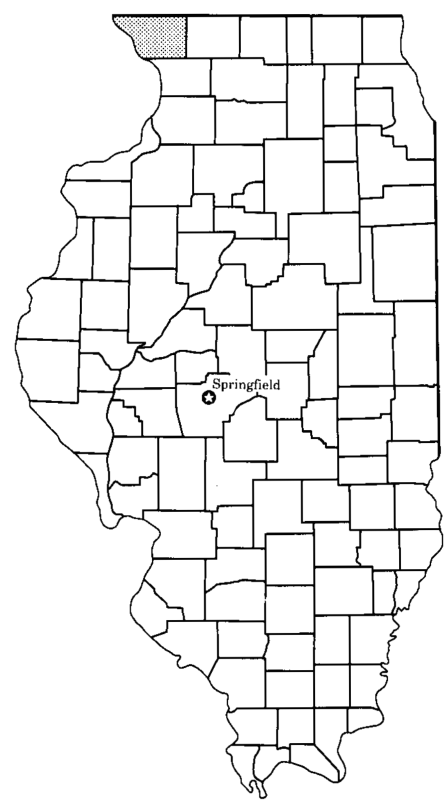

Figure 1.—Location of Jo Daviess County in Illinois.

General Nature of the County

This section provides general information about Jo Daviess County. It describes settlement and development, transportation facilities, and climate.

Settlement and Development

Chris Miller, soil scientist, Jo Daviess County, helped prepare this section.

The Sacs, Fox, Chippewa, Winnebago, and Menominee Indians occupied the survey area prior to non-Indian inhabitation. In 1827, miners took land that had been given to the Indians. The Winnebago War ensued. Most of the battles of this war were fought in Wisconsin. In 1832, the Black Hawk War began. It ended on August 2, 1832, at the Battle of Bad Axe.

Jo Daviess County is named after Major Joseph Hamilton Daviess. Daviess was born in Virginia in 1774.

In 1801, he went to Washington, D.C., where he became the first western lawyer to appear in the Supreme Court. Daviess joined the Army in 1811 and was fatally shot during the Battle of Tippecanoe. He never visited the Illinois county that perpetuates his name.

Jo Daviess County was established in 1822. It originally included about 5,529,600 acres, extending from an area north of the Illinois River all the way to the Wisconsin River, west to the Mississippi River, and east to what is now central Stevenson County. The county was eventually divided into eight counties. It has 23 townships.

The first post office in the county was opened in Galena in 1826. Fur trading, lead mining, and agriculture attracted people to the area.

During the 1800's, lead was extracted by hand. Black slaves called "Registered Servants" were used to extract the lead prior to 1840. This mining altered approximately 400 acres in the county.

Galena was politically important during the Civil War. Generals Grant, Parker, Rawlins, Smith, Chetlain, Maltby, and Baker all came from Jo Daviess County. The first man from the Northwest Territory to enlist in the Union Army came from Jo Daviess County. In all, 7,500 men from the county volunteered for service.

Currently, agriculture is the major industry in the county. Most of the acreage is used for agricultural purposes. The economic importance of urban and recreational development has increased in recent years.

Much of the county is underlain by dolomitic limestone. A number of quarries in the Galena Formation provide sand and gravel for building material and crushed rock for roads. The limestone also is used as a source of agricultural lime.

Transportation Facilities

Jo Daviess County has well developed transportation systems. U.S. Highway 20 crosses the county from east to west. Illinois Highways 78 and 84 cross the county from north to south, and Illinois Highway 35 crosses the northwest tip of the county. The main secondary roads are blacktopped. Most rural areas are accessible by all-weather roads. Railroads provide freight service to the county. The Mississippi River also provides freight service.

Climate

Audrey A. Bryan and Wayne Wendland, State Water Survey Division, Illinois Department of Energy and Natural Resources, helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Stockton in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 21 degrees F and the average daily minimum temperature is 12.5 degrees. The lowest temperature on record, which occurred at Stockton on January 30, 1951, is -26 degrees. In summer, the average temperature is 71 degrees and the average daily maximum temperature is 81 degrees. The highest recorded temperature, which occurred on August 17, 1988, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 35 inches. Of this, nearly 23 inches, or about 65 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 16 inches. The heaviest 1-day rainfall during the period of record was 4.6 inches.

The average seasonal snowfall is about 32 inches. The greatest snow depth at any one time during the period of record was 33 inches. On the average, 76 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 63 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 69 percent of the time possible in summer and 46 percent in winter. The prevailing wind is from the north-northwest. Average windspeed is highest, 12 miles per hour, in April.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil

formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small

areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Tama-Muscatine Association

Deep, nearly level to sloping, moderately well drained and somewhat poorly drained, silty soils that formed in loess; on uplands

This association consists of soils on broad ridges and side slopes on loess-covered uplands. Narrow drainageways are common. Slopes range from 1 to 10 percent.

This association makes up about 5 percent of the county. It is about 55 percent Tama and similar soils, 30 percent Muscatine soils, and 15 percent minor soils (fig. 2).

Tama soils are gently sloping and sloping and are moderately well drained. They are on ridges and on side slopes along drainageways. Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsoil is about 33 inches thick. It is friable. The upper part is dark brown silt loam, the next part is brown and dark yellowish brown silty clay loam, and the lower part is dark yellowish brown and yellowish brown, mottled silty clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silty clay loam.

Muscatine soils are nearly level and somewhat poorly drained. They are on broad ridges. Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is black and very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is mottled, friable silty clay loam about 37 inches thick. The upper part is brown, and the lower part is grayish brown. The underlying material to a depth of 60 inches is grayish brown, mottled, friable silt loam.

Of minor extent in this association are Beaucoup and Sable soils. The poorly drained Beaucoup soils are in the lower areas along drainageways. The poorly drained Sable soils are in the lower landscape positions.

This association is used mainly for cultivated crops. The nearly level and gently sloping soils are well suited to cultivated crops, and the more sloping soils are moderately suited. Erosion is the major hazard.

The nearly level soils in this association are poorly suited to septic tank absorption fields and to dwellings with basements and are moderately suited dwellings without basements. The gently sloping and sloping soils are moderately suited to these uses. The seasonal high water table and the shrink swell potential are the major limitations.

2. Fayette-Palsgrove-Rozetta Association

Deep, gently sloping to very steep, well drained and moderately well drained, silty soils that formed in loess or in loess and the underlying dolomitic limestone residuum; on uplands and stream terraces

This association consists of soils on ridges and on side slopes along drainageways. Narrow drainageways are common. Slopes range from 2 to 40 percent.

This association makes up about 30 percent of the county. It is about 64 percent Fayette and similar soils, 17 percent Palsgrove soils, 15 percent Rozetta and similar soils, and 4 percent minor soils (fig. 3).

Fayette soils are gently sloping to very steep and are well drained. They are on ridges and on side slopes

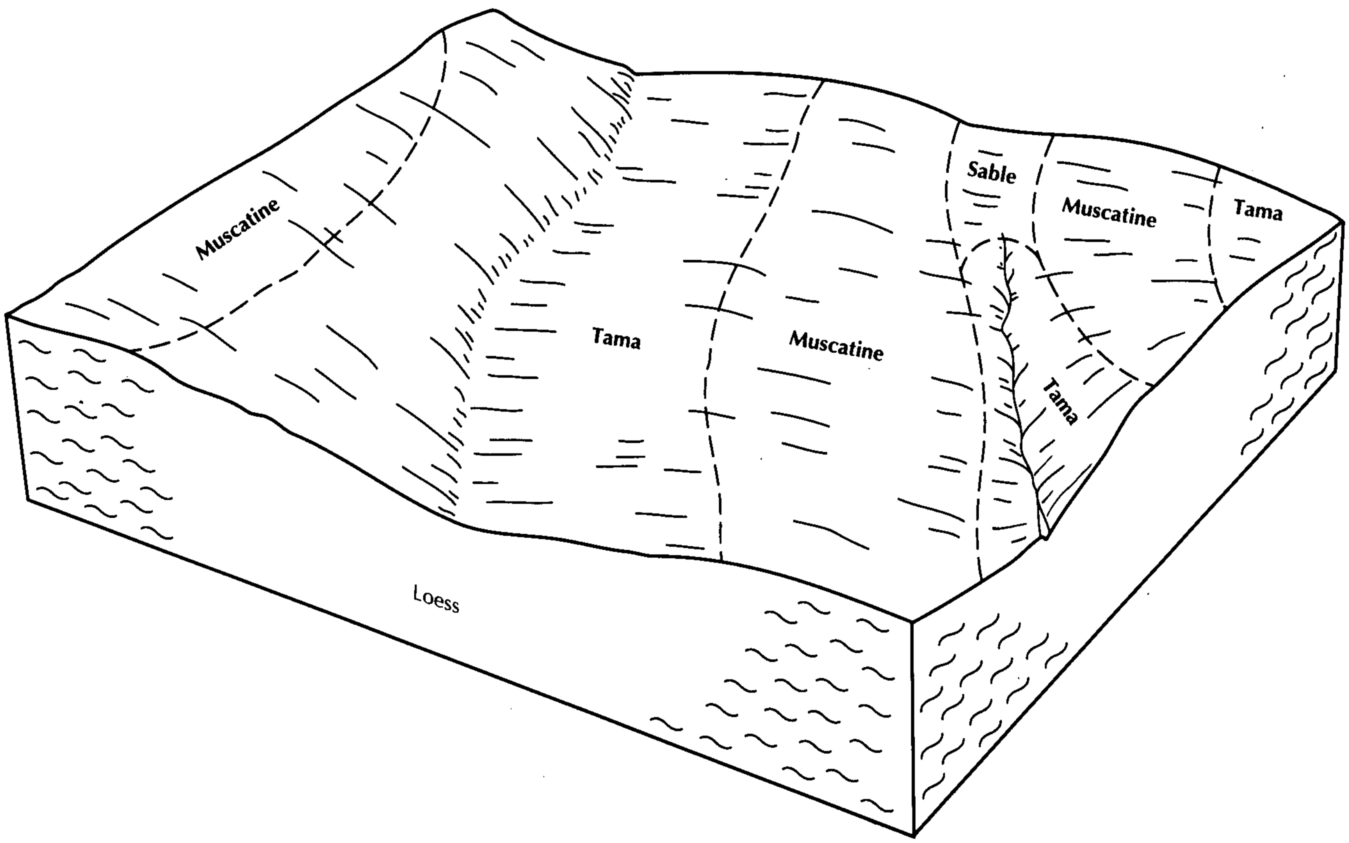

Figure 2.—Typical pattern of soils and parent material in the Tama-Muscatine association.

along drainageways. Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is about 40 inches thick. It is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silty clay loam and silt loam. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, friable silt loam.

Palsgrove soils are gently sloping to steep and are well drained. They are in the lower areas on narrow ridges and on side slopes along drainageways. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is about 42 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is strong brown, firm silty clay. Brownish yellow dolomitic limestone bedrock is at a depth of about 50 inches.

Rozetta soils are gently sloping to strongly sloping and are moderately well drained. They are on the higher ridges and on side slopes along drainageways. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil is about 37 inches thick. It is friable. The upper part is yellowish brown silty clay loam; the next part is yellowish and brown, mottled silty clay loam; and the lower part is light brownish gray, mottled silt loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam.

Of minor extent in this association are Derinda, Dubuque, NewGlarus, and Stronghurst soils. The moderately well drained Derinda soils are on the higher side slopes along the drainageways on incised knolls. They have calcareous shale bedrock at a depth of 20 to 40 inches. The well drained Dubuque and NewGlarus soils are in the lower areas on narrow ridges and on side slopes along drainageways. The somewhat poorly drained Stronghurst soils are on broad ridges.

This association is used mainly for cultivated crops or for hay or pasture. The gently sloping soils generally are well suited to these uses, and the more sloping soils are moderately suited to generally unsuited. Erosion is the major hazard.

This association is moderately suited to woodland. It is well suited to woodland wildlife habitat.

The gently sloping to strongly sloping soils in this

association are well suited, moderately suited, or poorly suited to septic tank absorption fields. The seasonal high water table, restricted permeability, and the slope are the major limitations. The steep and very steep soils are generally unsuited to septic tank absorption fields and dwellings because of the slope. The gently sloping to strongly sloping soils are moderately suited to dwellings. The slope and the shrink-swell potential are the major limitations. In some areas wetness and the depth to bedrock are limitations on sites for dwellings with basements.

3. Dubuque-Lacrescent-Dunbarton Association

Shallow to deep, sloping to very steep, well drained, silty soils that formed in loess and the underlying dolomitic limestone residuum or in loess and the underlying dolomitic limestone colluvium; on uplands

This association consists of soils on narrow ridges and on side slopes along drainageways. It is characterized by narrow valleys surrounded by very steep side slopes that have outcrops of limestone. The side slopes separate the bottom land from the uplands. Slopes range from 4 to 50 percent.

This association makes about 23 percent of the county. It is about 29 percent Dubuque and similar soils, 22 percent Lacrescent soils, 16 percent Dunbarton and similar soils, and 33 percent minor soils (fig. 4).

Dubuque soils are moderately deep and are sloping to steep. They are on ridges and on side slopes along drainageways. Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 26 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is brown and strong brown, firm silty clay. Yellow dolomitic limestone bedrock is at a depth of about 33 inches.

Lacrescent soils are deep and are steep and very steep. They are on the lower side slopes along streams

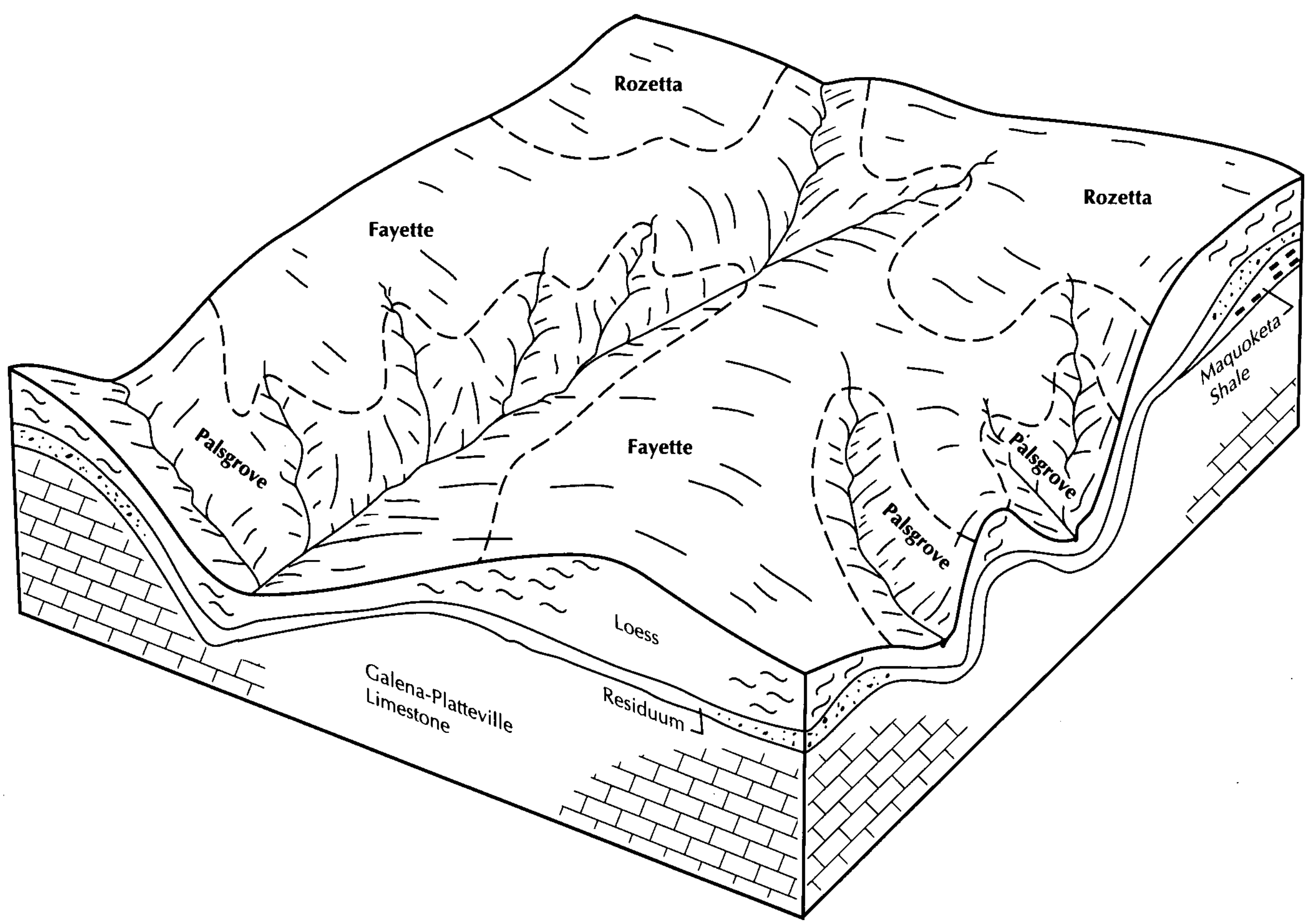

Figure 3.—Typical pattern of soils and parent material in the Fayette-Palsgrove-Rozetta association.

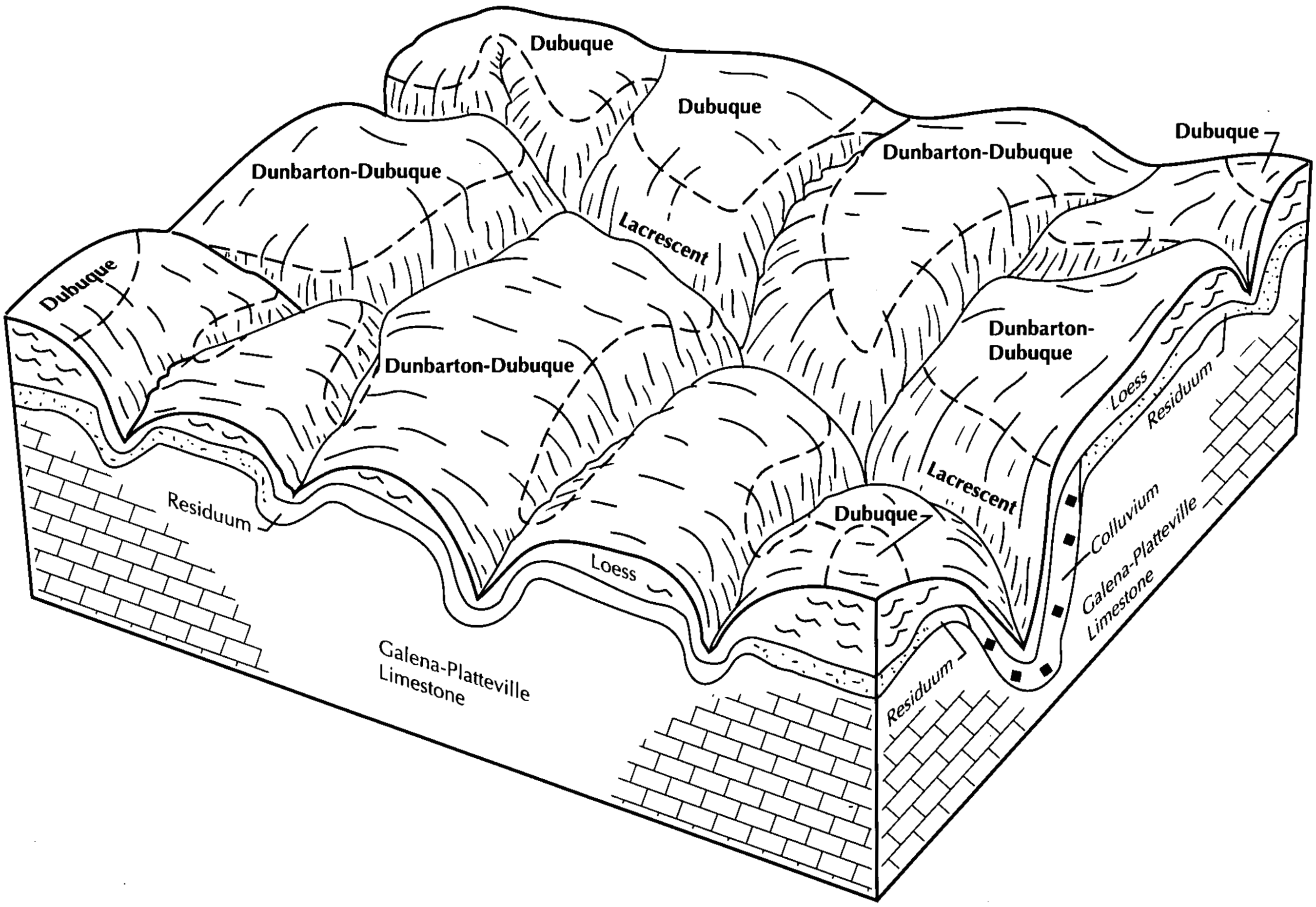

Figure 4.—Typical pattern of soils and parent material in the Dubuque-Lacrescent-Dunbarton association.

and drainageways. Typically, the surface layer is black, calcareous, friable silty clay loam about 5 inches thick. The subsurface layer is about 13 inches of very dark gray and very dark grayish brown, calcareous, friable gravelly silty clay loam and very gravelly silt loam. The subsoil is about 27 inches thick. It is calcareous and friable. The upper part is brown very gravelly silt loam, and the lower part is yellowish brown very cobbly silt loam. The underlying material to a depth of 60 inches is brown, calcareous, friable very gravelly silt loam.

Dunbarton soils are shallow and are sloping to steep. They are on the points of ridges and on side slopes along drainageways. Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsoil is about 7 inches thick. It is brown. The upper part is firm silty clay, and the lower part is very firm clay. Dolomitic limestone bedrock is at a depth of about 15 inches.

Of minor extent in this association are Beavercreek, Elco, Fayette, and Lawson soils. The moderately well drained Beavercreek and somewhat poorly drained Lawson soils are in the lower areas along drainageways. The moderately well drained Elco soils are on side slopes near the head of drainageways. The well drained Fayette soils are on the higher ridges and on side slopes near the head of drainageways.

Most areas of this association are used for cultivated crops or for hay or pasture. The sloping and strongly sloping soils are well suited, moderately suited, or poorly suited to cultivated crops and to hay and pasture, and the steep and very steep soils are generally unsuited. Erosion is the major hazard.

This association is moderately suited to woodland. It well suited to woodland wildlife habitat.

The sloping and strongly sloping soils in this association are poorly suited or generally unsuited to septic tank absorption fields. The depth to bedrock and a poor filtering capacity are the major limitations. The steep and very steep soils are generally unsuited to septic tank absorption fields and dwellings because of

the slope. The sloping and strongly sloping soils moderately suited, poorly suited, or generally unsuited to dwellings without basements and are poorly suited or generally unsuited to dwellings with basements. The depth to bedrock, the shrink-swell potential, and the slope are the major limitations.

4. Rozetta-Eleroy-Derinda Association

Deep and moderately deep, gently sloping to very steep, moderately well drained, silty soils that formed in loess or in loess and the underlying calcareous shale residuum; on uplands

This association consists of soils on knolls and ridges and on side slopes along drainageways. It is highly dissected by narrow drainageways. It is wedged between two major formations of limestone on uplands. Slopes range from 2 to 45 percent.

This association makes up about 20 percent of the county. It is about 40 percent Rozetta and similar soils, 30 percent Eleroy and similar soils, 21 percent Derinda and similar soils, and 9 percent minor soils (fig. 5).

Rozetta soils are deep and are gently sloping to strongly sloping. They are on ridges and on side slopes along drainageways. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil is about 37 inches thick. It is friable. The upper part is yellowish brown silty clay loam; the next part is yellowish brown and brown, mottled silty clay loam; and the lower part is light brownish gray, mottled silt loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam.

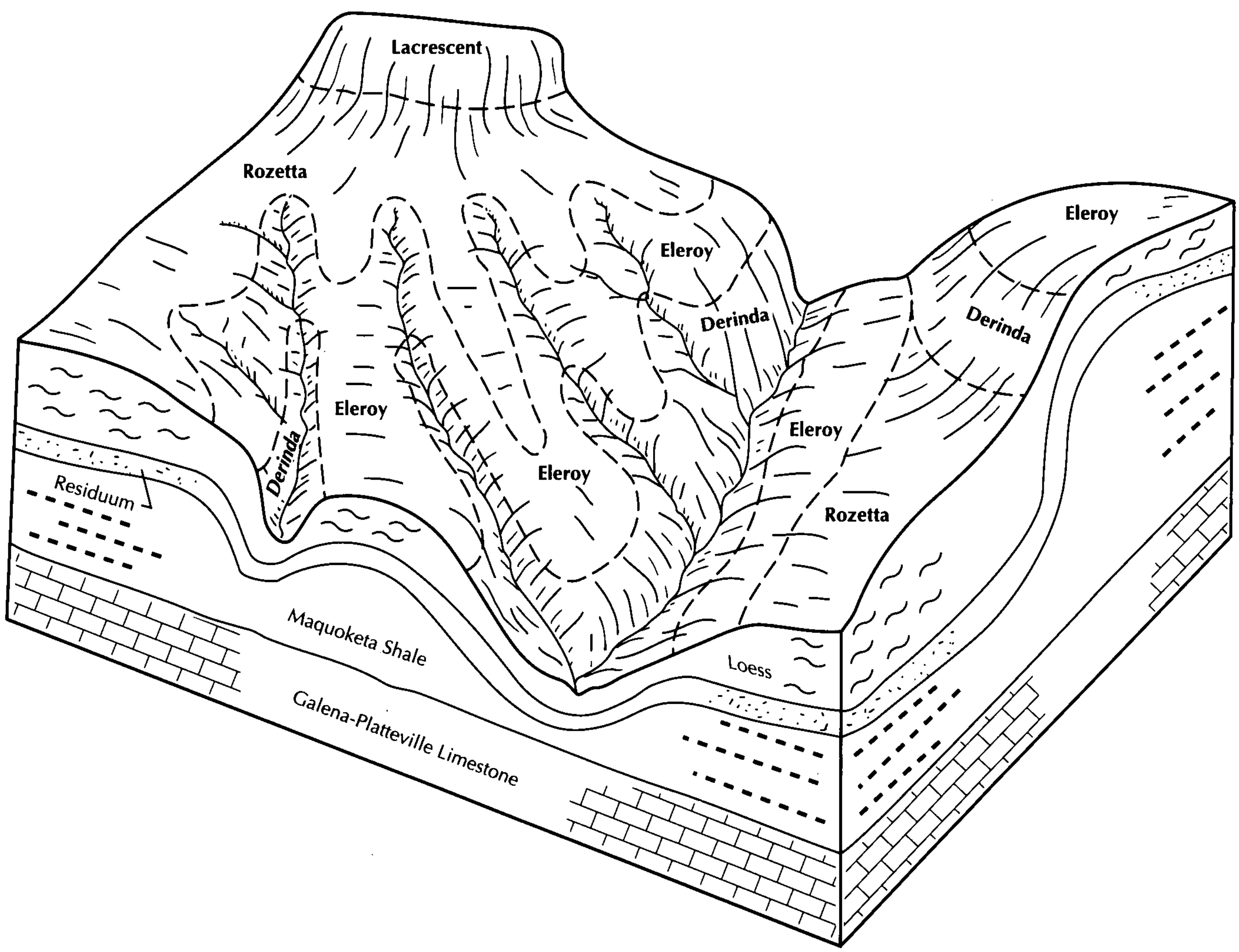

Figure 5.—Typical pattern of soils and parent material in the Rozetta-Eleroy-Derinda association.

Eleroy soils are deep and are sloping to steep. They are on ridges and on side slopes along drainageways. Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 40 inches thick. The upper part is yellowish brown, friable silty clay loam; the next part is brown, mottled, friable silty clay loam and silt loam; and the lower part is light olive gray, mottled, calcareous, firm silty clay loam. Light olive gray, calcareous, firm silty clay loam shale bedrock is at a depth of about 46 inches.

Derinda soils are moderately deep and are gently sloping to very steep. They are on narrow ridges and on side slopes along drainageways. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is about 27 inches thick. The upper part is yellowish brown, mottled, friable silty clay loam; the next part is pale olive, mottled, calcareous, firm silty clay; and the lower part is light olive gray, calcareous, firm silty clay. Light olive gray, calcareous, very firm silty clay shale bedrock is at a depth of about 35 inches.

Of minor extent in this association are Beavercreek, Lacrescent, Lawson, Loran, and Shullsburg soils. The moderately well drained Beavercreek and somewhat poorly drained Lawson soils are in the lower areas along drainageways. The well drained Lacrescent soils are on the higher side slopes of knolls and in the lower areas on side slopes along drainageways. They formed in dolomitic limestone colluvium. The somewhat poorly drained Loran and Shullsburg soils are in the lower landscape positions and on the broader ridges.

This association is used mainly for cultivated crops or for hay or pasture. The gently sloping and sloping soils are well suited or moderately suited to these uses, and the steep and very steep soils are poorly suited or generally unsuited. The strongly sloping soils are poorly suited to cultivated crops and moderately suited to hay and pasture. Erosion is the major hazard, and wetness the main limitation.

This association is moderately suited to woodland. It well suited to woodland wildlife habitat.

The gently sloping to strongly sloping soils in this association are moderately suited or poorly suited to septic tank absorption fields. The depth to bedrock, wetness, and restricted permeability are the major limitations. The slope of the strongly sloping soils is an additional limitation. The steep and very steep soils are generally unsuited to septic tank absorption fields and dwellings because of the slope. The gently sloping to strongly sloping soils are moderately suited to dwellings. The shrink-swell potential is the major limitation on sites for dwellings without basements, and wetness, the depth to bedrock, and the shrink-swell potential are the major limitations on sites for dwellings with basements. The slope of the strongly sloping soils is an additional limitation.

5. NewGlarus-Lamoille-Lacrescent Association

Moderately deep and deep, strongly sloping to very steep, well drained, silty soils that formed in loess and the underlying dolomitic limestone residuum or in loess and the underlying dolomitic limestone colluvium; on uplands

This association consists of soils on ridgetops and side slopes at the highest elevations in the county. The landscape is characterized by steep side slopes that have outcrops of limestone bedrock. Slopes range from 7 to 50 percent.

This association makes up about 11 percent of the county. It is about 30 percent NewGlarus soils, 25 percent Lamoille soils, 20 percent Lacrescent soils, and 25 percent minor soils (fig. 6).

NewGlarus soils are moderately deep and are strongly sloping to very steep. They are on ridges and side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is yellowish brown, firm silty clay loam; and the lower part is strong brown, firm gravelly silty clay. Yellow dolomitic limestone bedrock is at a depth of about 34 inches.

Lamoille soils are deep and are steep and very steep. They are on side slopes and foot slopes along drainageways. Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. The upper part is yellowish brown, friable silty clay loam; the next part is yellowish brown, firm gravelly and cobbly silty clay; and the lower part is light yellowish brown, calcareous, friable very cobbly silt loam.

Lacrescent soils are deep and are steep and very steep. They are on side slopes. Typically, the surface layer is black, calcareous, friable silty clay loam about 5 inches thick. The subsurface layer is very dark gray and very dark grayish brown, calcareous, friable gravelly and very gravelly silt loam about 13 inches thick. The subsoil is about 27 inches thick. It is calcareous and friable. The upper part is brown very gravelly silt loam, and the lower part is yellowish brown very cobbly silt loam. The underlying material to a depth of 60 inches is brown, calcareous, friable very gravelly silt loam.

Of minor extent in this association are Beavercreek, Derinda, Elizabeth, and Fayette soils. The moderately

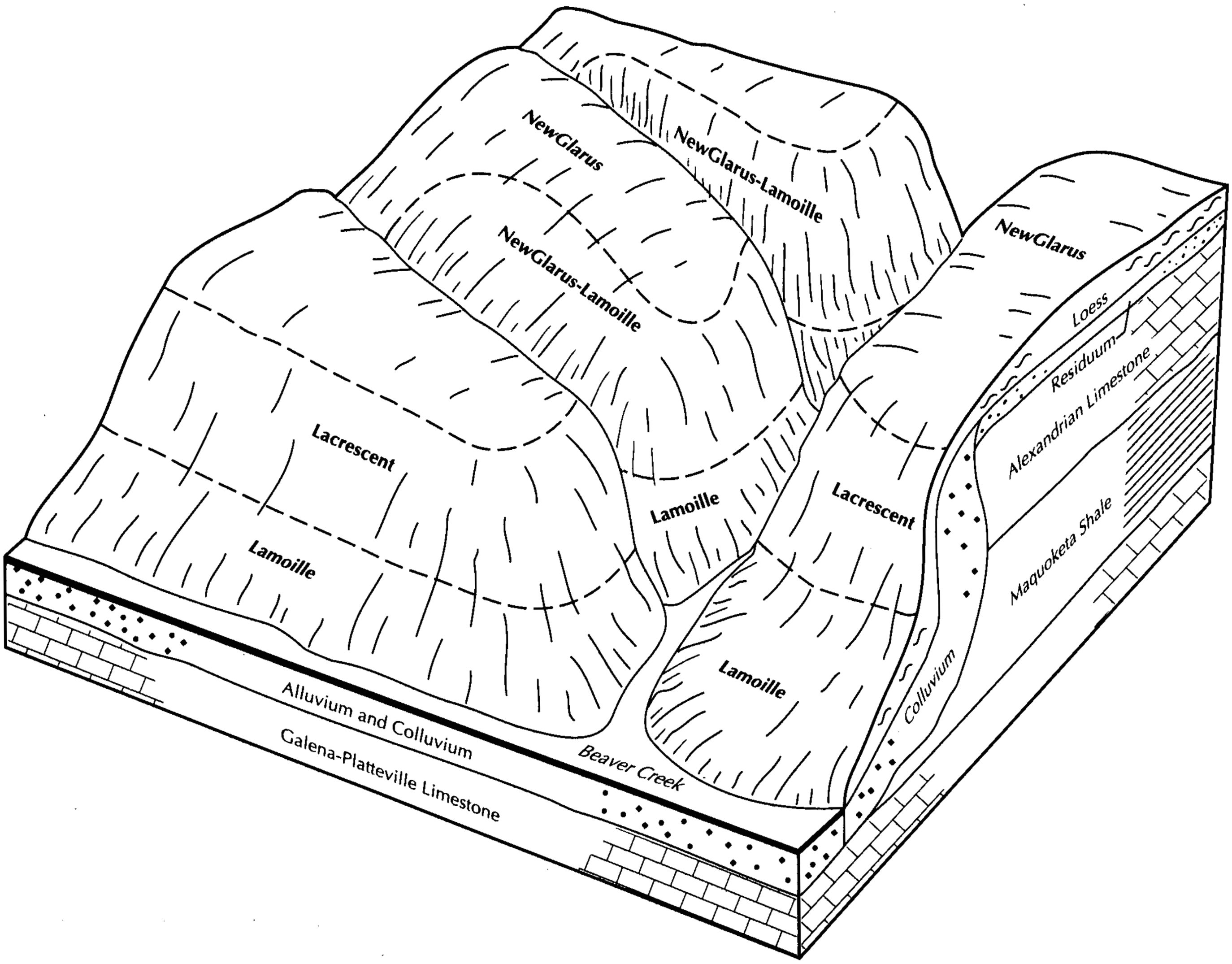

Figure 6.—Typical pattern of soils and parent material in the NewGlarus-Lamoille-Lacrescent association.

well drained Beavercreek soils are in drainageways or in the lower areas. The moderately well drained Derinda soils are on the lower side slopes along drainageways. They have shale bedrock at a depth of 20 to 40 inches. The somewhat excessively drained Elizabeth soils are on narrow ridges. They have limestone bedrock within a depth of 20 inches. The well drained Fayette soils formed in loess at the head of drainageways and on the broader ridges.

The strongly sloping soils in this association are used mainly for cultivated crops or for hay or pasture. The steep and very steep soils are used as pasture, hayland, or woodland. The strongly sloping soils generally are well suited or moderately suited to cultivated crops and to hay and pasture, and the steep and very steep soils are poorly suited or generally unsuited. Erosion and the slope are the major management concerns.

The steep and very steep soils in this association are moderately suited to woodland. They are well suited to woodland wildlife habitat.

The strongly sloping soils are poorly suited to septic tank absorption fields. The depth to bedrock and restricted permeability are the major limitations. The steep and very steep soils are generally unsuited to septic tank absorption fields and dwellings because of the slope. The strongly sloping soils are moderately suited to dwellings without basements and are poorly suited to dwellings with basements. The shrink-swell potential and the slope are the major limitations on sites for dwellings without basements. The depth to bedrock is a limitation on sites for dwellings with basements.

6. Wakeland-Dorchester-Birds Association

Deep, nearly level, moderately well drained to poorly drained, silty soils that formed in alluvium that in some areas is calcareous; on flood plains

This association consists of nearly level soils on flood plains along the Mississippi River and other major streams. These soils are frequently flooded or occasionally flooded for long or brief periods. Slopes range from 0 to 2 percent.

This association makes up about 8 percent of the county. It is about 28 percent Wakeland and similar soils, 26 percent Dorchester and similar soils, 15 percent Birds soils, and 31 percent minor soils.

Wakeland soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The underlying material is mottled, friable silt loam about 41 inches thick. The upper part is dark grayish brown, and the lower part is dark gray. Below this to a depth of 60 inches is a buried soil of black, friable silt loam.

Dorchester soils are moderately well drained. Typically, the surface layer is dark grayish brown, calcareous, friable silt loam about 8 inches thick. The underlying material is dark grayish brown, mottled, calcareous, friable silt loam about 14 inches thick. Below this to a depth of 60 inches is a buried soil of calcareous, friable silt loam. The upper part of the buried soil is black, and the lower part is very dark grayish brown.

Birds soils are poorly drained. Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches is dark gray and dark grayish brown, friable silt loam.

Of minor extent in this association are Algansee, Medary, Raddle, and Zwingle soils. The somewhat poorly drained Algansee soils formed in sandy alluvium in the slightly higher landscape positions. The moderately well drained Medary and poorly drained Zwingle soils are in the higher areas on terraces and are not subject to flooding. Medary soils contain more clay in the surface layer and subsoil than the major soils, and Zwingle soils contain more clay in the subsoil. The moderately well drained Raddle soils are in the higher landscape positions. Their surface layer is darker than that of the major soils.

Most areas where this association is along the Mississippi River are used as woodland and as habitat for wetland wildlife. Areas along the other major streams are used mainly for cultivated crops or for hay or pasture. The major soils are well suited or moderately suited to woodland and to habitat for wetland wildlife. The Birds soils are generally unsuited to cultivated crops and to hay and pasture, and the Wakeland and Dorchester soils are well suited or moderately suited. The hazard of flooding and the seasonal high water table are the main management concerns. The flooding delays planting and harvesting in some years.

The major soils are generally unsuited to septic tank absorption fields and dwellings because of the flooding and ponding.

7. Sparta-Lamont Association

Deep, gently sloping to strongly sloping, excessively drained and well drained, sandy and loamy soils that formed in wind- or water-deposited material; on stream terraces

This association consists of soils on broad flats, narrow ridges, and side slopes on stream terraces, mainly along the Mississippi River. Slopes range from 1 to 15 percent.

This association makes up about 2 percent of the county. It is about 65 percent Sparta and similar soils, 20 percent Lamont and similar soils, and 15 percent minor soils.

Sparta soils are gently sloping to strongly sloping and are excessively drained. They are on broad flats, narrow ridges, and side slopes. Typically, the surface layer is very dark brown, very friable loamy sand about 9 inches thick. The subsurface layer is very dark grayish brown, very friable loamy sand about 7 inches thick. The subsoil is brown, very friable sand about 20 inches thick. The underlying material to a depth of 60 inches is dark yellowish brown, loose sand.

Lamont soils are gently sloping to strongly sloping and are well drained. Typically, the surface layer is dark grayish brown, very friable fine sandy loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown and brown, very friable fine sandy loam, and the lower part occurs as alternating bands of brown and dark yellowish brown, loose fine sand and very friable fine sandy loam.

Of minor extent in this association are Beaucoup, Chelsea, Hoopeston, Orion, and Raddle soils. Beaucoup, Hoopeston, Orion, and Raddle soils contain more clay throughout than the major soils. The poorly drained Beaucoup and somewhat poorly drained Orion soils are on flood plains along drainageways. The somewhat poorly drained Hoopeston soils are in the slightly lower landscape positions. The moderately well drained Raddle soils are in the lower areas on the terraces and are subject to rare flooding. The excessively drained Chelsea soils are on very steep ridges and side slopes.

This association is used mainly for cultivated crops or

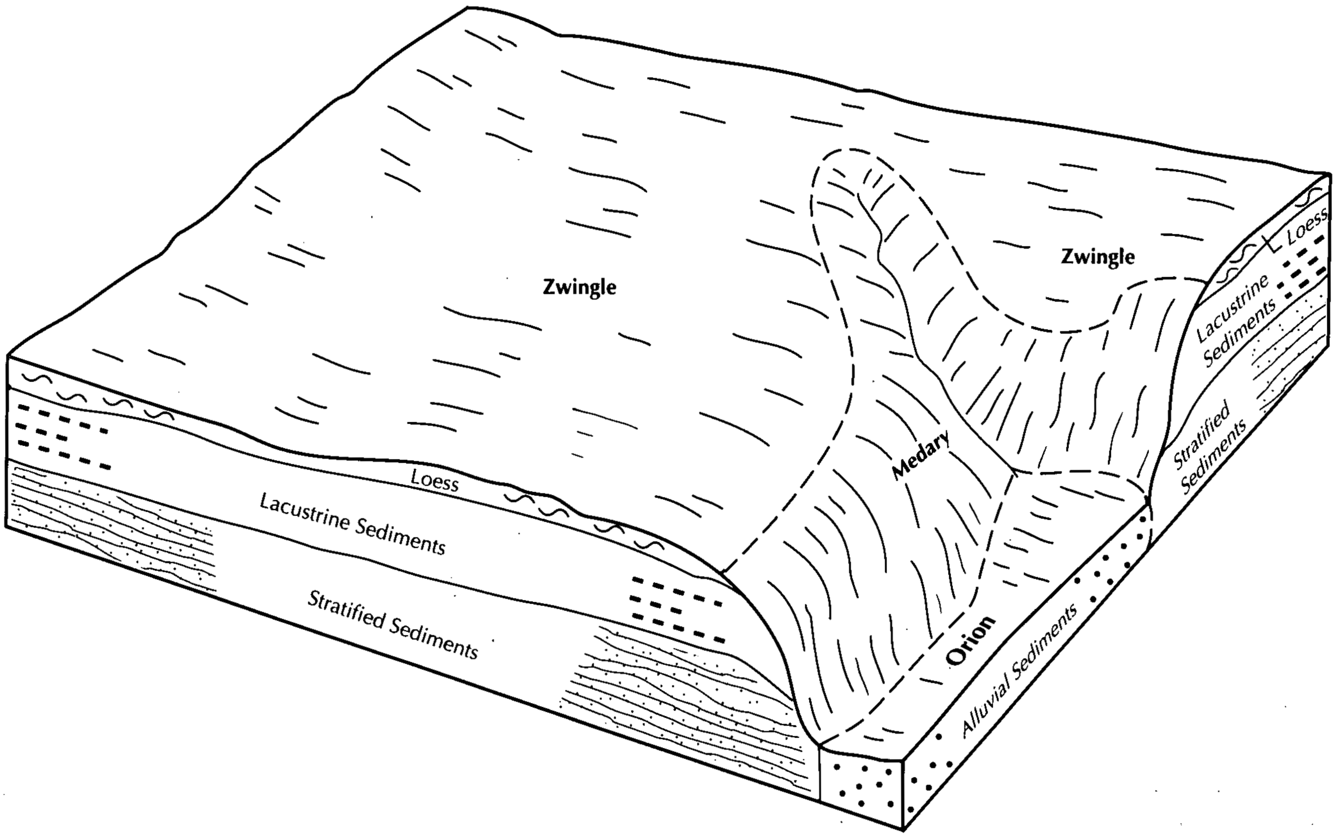

Figure 7.—Typical pattern of soils and parent material in the Zwingle-Medary association.

for hay or pasture. The gently sloping soils are moderately suited or poorly suited to cultivated crops and well suited or moderately suited to hay and pasture. The strongly sloping soils are poorly suited or generally unsuited to cultivated crops and moderately suited or poorly suited to hay and pasture. Low fertility, droughtiness, soil blowing, and water erosion are the main management concerns.

The Sparta soils are poorly suited to septic tank absorption fields because of a poor filtering capacity. The Lamont soils are well suited or moderately suited to septic tank absorption fields, and both soils are well suited or moderately suited to dwellings. The slope of the strongly sloping Lamont soils is a limitation on sites for dwellings and septic tank absorption fields.

8. Zwingle-Medary Association

Deep, nearly level to very steep, poorly drained and moderately well drained, silty soils that formed in lacustrine sediments or in loess and the underlying lacustrine material; on stream terraces

This association consists of soils on broad flats and side slopes on stream terraces, mainly along the Mississippi River and the lower reaches of its tributaries. Slopes range from 0 to 45 percent.

This association makes up about 1 percent of the county. It is about 39 percent Zwingle and similar soils, 26 percent Medary soils, and 35 percent minor soils (fig. 7).

Zwingle soils are nearly level and poorly drained. They are on broad flats. Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer also is dark grayish brown, friable silt loam. It is about 3 inches thick. The subsoil is about 30 inches thick. It is mottled and firm. The upper part is grayish brown silty clay and clay, and the lower part is reddish brown silty clay and silty clay loam. The underlying material extends to a depth of 60 inches. It is mottled. The upper part is light brownish gray, strong brown, and grayish brown, firm silty clay, and the lower part is stratified, friable, light brownish gray silt loam, yellowish brown fine sandy loam, and reddish brown silty clay loam and silty clay.

Medary soils are sloping to very steep and are moderately well drained. They are on side slopes along

the major streams and drainageways. Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 41 inches thick. In sequence downward, it is reddish brown, firm clay; brown, mottled silty clay; stratified, reddish brown, mottled, firm silty clay, light olive brown silty clay loam, and light brownish gray silt loam; and stratified, strong brown and light brownish gray, friable silt loam and reddish brown silty clay. The underlying material to a depth of 60 inches is stratified, friable, calcareous, strong brown and light brownish gray silt loam and dark reddish brown and dark reddish gray silty clay.

Of minor extent in this association are Dickinson, Downs, Hoopeston, Lamont, Orion, and Rozetta soils. Dickinson, Hoopeston, and Lamont soils contain more sand throughout than the major soils. The somewhat excessively Dickinson and somewhat poorly drained Hoopeston soils are in the slightly higher areas. The well drained Lamont and moderately well drained Downs and Rozetta soils are in the higher areas. Downs and Rozetta soils contain less clay in the subsoil than the major soils. The somewhat poorly drained Orion soils formed in alluvium on flood plains.

The nearly level to sloping soils in this association are used mainly for cultivated crops or for hay or pasture. The steep and very steep soils are used mainly as woodland or pasture. The nearly level to sloping soils are moderately suited to cultivated crops and well suited to hay and pasture. The very steep soils are generally unsuited to cultivated crops and to hay and pasture. Erosion, the slope, and tilth are the main management concerns. The seasonal high water table delays planting and harvesting in some years.

The steep and very steep soils in this association are poorly suited to woodland. They are moderately suited to woodland wildlife habitat.

The nearly level to sloping soils in this association are poorly suited or generally unsuited to septic tank absorption fields and dwellings. Restricted permeability, the seasonal high water table, and the shrink-swell potential are the main limitations. The steep and very steep soils are generally unsuited to septic tank absorption fields and dwellings because of the slope.

Broad Land Use Considerations

In 1982, about 46 percent of the acreage in Jo Daviess County was used for crops, mainly corn; 20 percent was used as pasture; and 18 percent was used as woodland. The rest of the acreage was used for other purposes, including urban and recreational development and wildlife habitat *(10)*. The soils in the county vary greatly in their suitability for major land uses.

The cropland is in scattered areas throughout the county. It is the major use in areas of associations 1, 2, 3, 4, 7, and 8. The major management concerns in these areas are water erosion and wetness. Also, drought and soil blowing are hazards in areas of association 7. Most areas in association 6 are frequently flooded, mainly in early spring. The flooding can delay fieldwork or cause slight or moderate crop damage. The seasonal high water table also is a limitation in areas of this association.

The hayland and pasture is in scattered areas throughout the county. Associations 2 through 7 have substantial acreages of hayland and pasture. The soils in all of the associations in the county generally are well suited or moderately suited to hay and pasture. The steep and very steep soils, however, are poorly suited or generally unsuited. Erosion is the main hazard in areas of associations 2 through 5. Flooding and the seasonal high water table are management concerns in areas of association 6. Drought-resistant species should be selected for planting in areas of association 7. Soil blowing and water erosion are hazards in areas of this association.

Most of the woodland in the county is in areas of associations 3, 5, and 6. The soils in these associations generally are well suited or moderately suited to woodland. Erosion is the major hazard in areas of associations 3 and 5, and the slope is an additional management concern in the steep and very steep areas of these associations. Wetness is the major limitation in areas of association 6.

In general, the gently sloping and sloping Tama, Downs, Fayette, Rozetta, and Seaton soils are the best suited soils in the county for urban uses. The better suited soils are most extensive in associations 1 and 2. The other soils in these associations are limited by the seasonal high water table, restricted permeability, the slope, or the depth to bedrock. Associations 3, 4, and 5 are moderately suited, poorly suited, or generally unsuited to urban uses. The depth to bedrock, the shrink-swell potential, restricted permeability, the seasonal high water table, and the slope are the major limitations. Soils on flood plains, such as those in association 6, are generally unsuited to urban uses because of the hazard of flooding. Some of the soils in association 7 have a poor filtering capacity, which is a limitation on sites for septic tank absorption fields. This association is moderately suited or poorly suited to urban uses. Association 8 is generally unsuited to these uses because of restricted permeability, wetness, the shrink-swell potential, and the slope. When sites are

selected for urban development, the extent of prime farmland in a given area should be considered along with the limitations of the soils.

The suitability of the soils in the county for recreational uses varies widely, depending on the intensity of the use and the soil properties. The soils that are best suited to these uses are gently sloping or sloping. Examples are the less sloping soils in associations 1, 2, 4, and 7. The main limitations affecting intensive recreational uses, such as playgrounds, picnic areas, and camp areas, are wetness in nearly level areas of association 1, a sandy surface layer in most areas of association 7, and the slope in the more sloping areas of associations 1, 2, 3, 4, 5, and 7. Soils that are subject to flooding or are wet, such as those in associations 6 and 8, generally are poorly suited to intensive recreational uses. Small areas that are suitable for intensive recreational development generally are available in all of the associations. All of the soils in county, except for the very steep ones, are suitable for trails used for hiking or horseback riding.

The suitability for wildlife habitat is generally good throughout the county. Most of the associations include soils that are well suited to openland wildlife habitat. The soils that are best suited to woodland wildlife habitat are in associations 3, 5, and 6. Some of the soils in associations 6 and 8 are well suited to certain types of wetland wildlife habitat.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Dubuque silt loam, 10 to 15 percent slopes, eroded, is a phase of the Dubuque series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Dunbarton-Dubuque silt loams, 15 to 25 percent slopes, eroded, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol the soil maps.

In some areas the detailed soil maps of this county do not join with those of Carroll and Stephenson Counties, Illinois, and Lafayette and Grant Counties, Wisconsin. Differences result from refinements in series concepts, variations in the extent of individual soils, and the application of the latest soil classification system. The soils in these areas have similar properties and similar potentials for major land uses. Differences in names of the map units do not significantly affect the use and management of the soils.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

27D2—Miami silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is mixed dark grayish brown and brown, friable silt loam about 8 inches thick. The subsoil is about 29 inches thick. The upper part is brown, friable silty clay loam; the next part is yellowish brown, firm clay loam; and the lower part is yellowish brown, mottled, firm, calcareous clay loam. The underlying material to a depth of 60 inches is light yellowish brown, brown, and dark brown, mottled,

friable, calcareous clay loam. In some areas the subsoil is redder. In other areas it contains more clay. In places the soil does not have free carbonates within a depth of 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Elco, Eleroy, and Derinda soils. Elco soils are in the higher, less sloping areas. Below a depth of 20 inches, they have a paleosol that formed in till. Eleroy and Derinda soils are in landscape positions similar to those of the Miami soil. Eleroy soils have calcareous shale bedrock at a depth of 40 to 60 inches. Derinda soils have calcareous shale bedrock at a depth of 20 to 40 inches. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. It is moderately suited to septic tank absorption fields and dwellings.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome this limitation.

If this soil is used as a site for dwellings, the slope is a limitation. Land shaping by cutting and filling helps to overcome this limitation. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing the foundations or extending the foundations below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IVe.

29C2—Dubuque silt loam, 4 to 10 percent slopes, eroded. This sloping, well drained, moderately deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are elongated or irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 28 inches thick. The upper part is yellowish brown, friable silty clay loam; the next part is brown, friable silty clay loam; and the lower part is dark yellowish brown and reddish brown, firm silty clay. Brownish yellow dolomitic limestone bedrock is at a depth of about 36 inches. In some places the layer of residuum is thicker. In other places the upper part of the subsoil contains less clay. In some areas the depth to dolomitic limestone bedrock is 40 to 60 inches. In other areas the surface layer is darker. In places calcareous shale bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of the well drained Dunbarton and moderately well drained Elco soils. Dunbarton soils have dolomitic limestone bedrock within a depth of 20 inches and contain more clay in the subsoil than the Dubuque soil. They are in landscape positions similar to those of the Dubuque soil. Elco soils are in the slightly higher areas at the head of drainageways. They do not have bedrock within a depth of 60 inches. The lower part of their subsoil formed in glacial till. Included areas make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Dubuque soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and to dwellings with basements. It is moderately suited to dwellings without basements.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil.

Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock, the slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability. Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

If this soil is used as a site for dwellings, the shrink-swell potential, the depth to bedrock, and the slope are limitations. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

29D2—Dubuque silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained, moderately deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 26 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is brown and strong brown, firm silty clay. Yellow dolomitic limestone bedrock is at a depth of about 33 inches. In some places the layer of residuum is thicker. In other places calcareous shale bedrock is at a depth of 20 to 40 inches. In some areas the depth to dolomitic limestone bedrock is 40 to 60 inches. In other areas the upper part of the subsoil contains less clay.

Included with this soil in mapping are small areas of the well drained Dunbarton and moderately well drained Elco soils. Dunbarton soils have dolomitic limestone bedrock within a depth of 20 inches and contain more clay in the subsoil than the Dubuque soil. They are in landscape positions similar to those of the Dubuque soil. Elco soils are in the higher areas at the head of drainageways. They do not have bedrock within a depth of 60 inches. The lower part of their subsoil formed in glacial till. Included areas make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Dubuque soil at a moderate rate and through the lower part of the subsoil and at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to dwellings with basements and to septic tank absorption fields and is moderately suited to dwellings without basements.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by stripcropping, contour farming, no-till farming, and a crop rotation that includes a forage crop.

Establishing pasture plants or hay on this soil helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent surface compaction and excessive runoff. If possible, the pasture or hayland should be tilled on the contour when a seedbed is prepared.

If this soil is used as a site for septic tank absorption fields, the depth to bedrock, the slow permeability, and the slope are limitations. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability. Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

If this soil is used as a site for dwellings, the shrink-swell potential, the depth to bedrock, and the slope are limitations. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

36B—Tama silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained, deep soil generally is on ridges in the uplands, but in a few areas it is on high stream terraces. Individual areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsoil is about 33 inches thick. It is friable. The upper part is dark brown silt loam, the next part is brown and dark yellowish

brown silty clay loam, and the lower part is dark yellowish brown and yellowish brown, mottled silty clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silty clay loam. In places the dark surface soil is thinner. In some areas the lower part of the subsoil contains more sand and clay. In other areas the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower landscape positions. They make up less than 5 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to septic tank absorption fields and dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

36C—Tama silt loam, 5 to 10 percent slopes. This sloping, moderately well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 41 inches thick. It is friable. The upper part is dark brown silt loam; the next part is dark yellowish brown and yellowish brown, mottled silty clay loam; and the lower part is light olive brown, mottled silt loam. The underlying material to a depth of 60 inches is light olive brown, mottled, friable silt loam. In some places the dark surface soil is thinner. In other places calcareous shale bedrock is at a depth of 40 to 60 inches. In some areas dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other areas the lower part of the subsoil contains more sand and clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion soils. These soils are in the lower areas along drainageways. They formed in alluvium. They make up less than 5 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to pasture and hay. It is moderately suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields.

Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

41B—Muscatine silt loam, 1 to 3 percent slopes. This nearly level, somewhat poorly drained, deep soil is on broad upland ridges and on stream terraces. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is black and very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is mottled, friable silty clay loam about 37 inches thick. The upper part is brown, and the lower part is grayish brown. The underlying material to a depth of 60 inches is grayish brown, mottled, friable silt loam. In some areas the dark surface soil is thinner. In other areas the depth to a seasonal high water table is more than 4 feet. In some places, the dark surface soil is thinner and the depth to a seasonal high water table is more than 4 feet. In other places calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower landscape positions. They make up less than 10 percent of the unit.

Water and air move through the Muscatine soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 2 to 4 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and to dwellings with basements and moderately suited to dwellings without basements.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard, particularly near drainageways. Also, the seasonal high water table is a limitation. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Subsurface tile drains help to lower the water table.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

53D—Bloomfield loamy fine sand, 7 to 15 percent slopes. This sloping and strongly sloping, somewhat excessively drained, deep soil is on upland ridgetops and side slopes and on stream terraces. Individual areas are irregular in shape and range from 3 to 25 acres in size.

Typically, the surface layer is dark grayish brown, very friable loamy fine sand about 8 inches thick. The subsurface layer is light yellowish brown, very friable fine sand about 24 inches thick. Between depths of 32 and 60 inches are alternating bands of strong brown, yellowish brown, and light yellowish brown, loose sand and brown, reddish brown, and yellowish red, very friable loamy sand. In some areas the subsoil has more than 6 inches of lamellae within a depth of 40 inches. In other areas the total thickness of the lamellae is less than 6 inches.

Included with this soil in mapping are small areas of the well drained Lamont and Tell soils. These soils contain more clay in the subsoil than the Bloomfield soil. They are in landscape positions similar to those of the Bloomfield soil. They make up 5 to 10 percent of the unit.

Water and air move through the Bloomfield soil at a rapid rate. Surface runoff is medium in pastured areas. Available water capacity is low. Organic matter content also is low.

Most areas are used for pasture or hay. Some are wooded. This soil is poorly suited to cultivated crops. It is moderately suited to hay and pasture. It is well suited

to woodland. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which increases the hazards of erosion and soil blowing. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, seedling mortality is a management concern because of a scarcity of available moisture. The seedling mortality rate can be reduced by managing for or planting species that can tolerate droughty conditions. Maintaining an adequate ground cover, planting grasses or legumes, and mulching conserve moisture and help to control soil blowing. Excluding livestock from the woodland protects newly planted trees and other trees and helps to maintain tree growth. Measures that protect the woodland from fire are needed.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. The site should be leveled. Filling or mounding with suitable material increases the filtering capacity of the field.

The land capability classification is IVe.

61B—Atterberry silt loam, 1 to 3 percent slopes. This nearly level, somewhat poorly drained, deep soil is on broad upland ridges and on stream terraces. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. It is mottled and friable. The upper part is brown silt loam, and the lower part is light brownish gray and grayish brown silty clay loam. In some places the dark surface soil is thicker. In other places the lower part of the subsoil contains more sand. In some areas the depth to a seasonal high water table is more than 4 feet. In other areas calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower landscape positions. They make up less than 10 percent of the unit.

Water and air move through the Atterberry soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard, particularly near drainageways. Also, the seasonal high water table is a limitation. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing underground drains adjacent to the absorption field helps to overcome the wetness.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundations helps to overcome this limitation.

The land capability classification is IIe.

68—Sable silty clay loam. This nearly level, poorly drained, deep soil is in depressions and shallow drainageways on uplands. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 13 inches thick. The subsoil to a depth of 60 inches is mottled, friable silty clay loam. The upper part is grayish brown, and the lower part is light olive gray. In a few places the dark surface soil is thicker. In some areas it is thinner. Some areas are undrained.

Included with this soil in mapping are small areas of the somewhat poorly drained Muscatine and Atterberry and moderately well drained Tama soils. These soils are in the slightly higher landscape positions. Atterberry soils have a dark surface layer that is thinner than that

of the Sable soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Sable soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the ponding.

Corn, soybeans, and small grain can be grown in most areas of this soil because a drainage system has been installed. Measures that maintain the drainage system are needed. Additional drainage measures are needed in some areas. Subsurface tile drains can reduce the wetness if outlets are available. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and minimize crusting.

If this soil is used for pasture or hay, the ponding is a hazard. It can be controlled by surface drains, ditches, and surface inlet tile. Deferment of grazing when the soil is too wet helps to prevent surface compaction and deterioration of tilth. Canarygrass and alsike clover are suitable. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

87A—Dickinson fine sandy loam, 0 to 3 percent slopes. This nearly level, somewhat excessively drained, deep soil is on broad stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface soil is very dark gray, friable fine sandy loam about 14 inches thick. The subsoil is about 31 inches thick. The upper part is brown, friable fine sandy loam, and the lower part is dark yellowish brown, very friable loamy fine sand. The underlying material to a depth of 60 inches is yellowish brown, loose loamy fine sand. In some areas the lower part of the subsoil contains more clay and is redder. In other areas the surface soil is lighter colored. In some places it is thicker. In other places the soil has less sand and more clay throughout. In some areas dolomitic limestone bedrock is within a depth of 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Hoopeston and excessively drained Sparta soils. Hoopeston soils are in the lower landscape positions. Sparta soils contain more sand in the surface layer and subsoil than the Dickinson soil. They are in landscape positions similar to those of the Dickinson soil. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Dickinson soil at a moderately rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The potential for frost action is moderate.

Most areas are cultivated. Some are used for pasture or hay. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to septic tank absorption fields and well suited to dwellings.

If this soil is used for corn, soybeans, or small grain, the moderate available water capacity and the level of fertility are limitations. Also, erosion and soil blowing are hazards. Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.

In the areas used as pasture, droughtiness and low fertility are limitations and soil blowing is a hazard. Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands. Bromegrass, tall fescue, and alfalfa are suitable. Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture in good condition and control soil blowing.

A poor filtering capacity is a limitation if this soil is used as a site for septic tank absorption fields. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. Conventional septic tank systems function satisfactorily. Anticipated population density is a primary consideration when the suitability for septic tank absorption fields is ascertained.

The land capability classification is IIIs.

88B—Sparta loamy sand, 1 to 7 percent slopes. This gently sloping, excessively drained, deep soil is on broad flats on stream terraces. Individual areas are irregularly shaped or long and narrow and range from 5 to 600 acres in size.

Typically, the surface layer is very dark brown, very friable loamy sand about 9 inches thick. The subsurface layer is very dark grayish brown, very friable loamy sand about 7 inches thick. The subsoil is brown, very friable sand about 20 inches thick. The underlying material to a depth of 60 inches is dark yellowish brown, loose sand. In some places the lower part of the

subsoil has red bands. In other places the surface soil is lighter colored. In some areas, the surface soil is lighter colored and the lower part of the subsoil has red bands. In other areas the surface soil is thicker.

Included with this soil in mapping are small areas of the somewhat excessively drained Dickinson and somewhat poorly drained Hoopeston soils. These soils contain more clay in the surface soil and subsoil than the Sparta soil. They are in the lower landscape positions. They make up less than 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content is moderately low.

Most areas are cultivated or are used for pasture or hay. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay. It is poorly suited to septic tank absorption fields and well suited to dwellings.

If this soil is used for corn, soybeans, or small grain, the moderate available water capacity and the level of fertility are limitations. Also, erosion and soil blowing are hazards. Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.

In the areas used as pasture, droughtiness and low fertility are limitations and soil blowing is a hazard. Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands. Bromegrass, tall fescue, and alfalfa are suitable. Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture in good condition and control soil blowing.

A poor filtering capacity is a limitation if this soil is used as a site for septic tank absorption fields. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. Conventional septic tank systems function satisfactorily. Anticipated population density is a primary consideration when the suitability for septic tank absorption fields is ascertained.

The land capability classification is IVs.

88D—Sparta loamy sand, 7 to 15 percent slopes. This strongly sloping, excessively drained, deep soil is on side slopes and narrow ridges on stream terraces. Individual areas are long and narrow and range from 3 to 40 acres in size.

Typically, the surface soil is very dark grayish brown, very friable loamy sand about 17 inches thick. The subsoil is about 26 inches thick. It is very friable. The upper part is brown loamy sand, and the lower part is dark yellowish brown sand. The underlying material to a depth of 60 inches is yellowish brown, loose sand. In some places the surface soil is thicker. In other places the lower part of the subsoil has red bands. In some areas the surface soil is lighter colored. In other areas, the surface soil is lighter colored and the lower part of the subsoil has red bands.

Included with this soil in mapping are small areas of the somewhat excessively drained Dickinson soils. These soils contain more clay in the surface soil and subsoil than the Sparta soil. They are in the lower landscape positions. They make up about 10 percent of the unit.

Water and air move through the Sparta soil at a moderately rapid rate. Surface runoff is slow in pastured areas. Available water capacity is low. Organic matter content is moderately low.

Most areas are used for pasture or hay. Some are wooded. This soil is poorly suited to pasture, hay, and septic tank absorption fields. It is generally unsuited to cultivated crops. It is moderately suited to coniferous trees and to dwellings.

In the areas used as pasture, droughtiness and low fertility are limitations and soil blowing is a hazard. Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands. Bromegrass, tall fescue, and alfalfa are suitable. Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture in good condition and control soil blowing.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. The site should be leveled. Filling or mounding with suitable material increases the filtering capacity of the field.

If this soil is used as a site for dwellings, the slope is a limitation. Land shaping by cutting and filling helps to overcome this limitation.

The land capability classification is VIs.

119C2—Elco silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, deep soil is on side slopes along drainageways in the uplands.

Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is yellowish brown, friable silty clay loam; the next part is yellowish brown, mottled, friable silty clay loam and silt loam; and the lower part is dark grayish brown and dark gray, mottled, friable silty clay loam and firm silty clay. In some places glacial till is at a depth of 40 to 60 inches. In other places, the surface layer is darker and glacial till is at a depth of 40 to 60 inches. In some areas calcareous shale bedrock is at a depth of 40 to 60 inches. In other areas the surface layer is darker.

Included with this soil in mapping are small areas of the moderately well drained Derinda and well drained Miami soils in the lower landscape positions. Derinda soils have calcareous shale bedrock at a depth of 20 to 40 inches. Miami soils have loamy glacial till within a depth of 20 inches. Included areas make up about 15 percent of the unit.

Water and air move through the upper part of the Elco soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Surface drains help to lower the water table. Enlarging the absorption field helps to overcome the restricted permeability.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

172—Hoopeston loam. This nearly level, somewhat poorly drained, deep soil is on stream terraces. Individual areas are irregular in shape and range from 2 to 50 acres in size.

Typically, the surface layer is black, friable loam about 11 inches thick. The subsurface layer is very dark gray, friable loam about 5 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is brown and yellowish brown, very friable sandy loam, and the lower part is yellowish brown, very friable, stratified loamy sand, sandy loam, and loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable, stratified silt loam and loam. In some places the subsoil contains more clay. In other places, the subsoil contains more clay and the underlying material contains more sand. In some areas the surface soil is thicker.

Included with this soil in mapping are small areas of the somewhat excessively drained Dickinson and poorly drained Sable soils. Dickinson soils are in the slightly higher landscape positions. Sable soils are in the lower areas. They contain more clay throughout than Hoopeston soil. Included areas make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Hoopeston soil at a moderately rapid rate and through the underlying material at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The potential for frost action is high.

Most areas are cultivated. Some are used for hay or pasture. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and dwellings.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop

residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used for pasture or hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Installing subsurface tile drains helps to overcome the wetness. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity and the seasonal high water table are limitations. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. Filling or mounding with suitable material increases the filtering capacity of the field. Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundations helps to overcome this limitation.

The land capability classification is I.

175B—Lamont fine sandy loam, 1 to 7 percent slopes. This gently sloping, well drained, deep soil is on narrow ridges on stream terraces. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is dark grayish brown, very friable fine sandy loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown and brown, very friable fine sandy loam, and the lower part occurs as alternating bands of brown and dark yellowish brown, loose fine sand and sand and very friable fine sandy loam. In places the surface soil is darker. In some areas the subsoil contains more clay. In other areas the lower part of the subsoil contains more clay.

Included with this soil in mapping are small areas of the excessively drained Chelsea and well drained Tell soils. Chelsea soils contain more sand throughout than the Lamont soil. They are in the more sloping areas. Tell soils have more clay and less sand in the upper part of the subsoil than the Lamont soil. They are in landscape positions similar to those of the Lamont soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Lamont soil at a moderately rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay and to septic tank absorption fields and dwellings.

In areas used for corn, soybeans, or small grain, soil blowing and water erosion are hazards. Low fertility and droughtiness are limitations. Contour farming and no-till farming or another system of conservation tillage that leaves crop residue on at least 30 percent the surface after planting help to prevent excessive soil loss and conserve moisture. Winter cover crops and field windbreaks help to control soil blowing. The moderately low organic matter content influences the effectiveness of applied herbicides. Application rates should be adjusted accordingly. Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching.

In areas used as pasture, droughtiness and low fertility are limitations and soil blowing is a hazard. Selection of drought-tolerant grasses and legumes for planting helps to maintain or improve forage stands. Bromegrass, tall fescue, and alfalfa are suitable. Fertilizer should be applied frequently and in small amounts. This method of application helps to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, rotation grazing, and timely deferment of grazing help to keep the pasture in good condition and control soil blowing.

The land capability classification is IIIe.

175D2—Lamont fine sandy loam, 7 to 15 percent slopes, eroded. This strongly sloping, well drained, deep soil is on side slopes on stream terraces and on ridgetops in the uplands. Individual areas are long and narrow and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown, very friable fine sandy loam about 9 inches thick. The subsoil is about 37 inches thick. It is very friable. The upper part is strong brown fine sandy loam, the next part is yellowish brown loamy fine sand, and the lower part occurs as alternating bands of yellowish brown loamy fine sand and strong brown fine sandy loam. The underlying material to a depth of 60 inches is yellowish brown, loose loamy fine sand. In some areas the subsoil contains more clay. In other areas it is darker.

Included with this soil in mapping are small areas of the somewhat excessively drained Bloomfield and well drained Seaton and Tell soils. These soils are in landscape positions similar to those of the Lamont soil. Bloomfield soils contain more sand and less clay throughout than the Lamont soil, Seaton soils contain more clay and less sand throughout, and Tell soils contain more clay and less sand in the upper part of the subsoil and less clay in the underlying material.

Included areas make up less than 15 percent of the unit.

Water and air move through the Lamont soil at a moderately rapid rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content is low. The potential for frost action is moderate.

Most areas are cultivated. Some are wooded. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to septic tank absorption fields and dwellings. It is well suited to woodland.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which increases the hazards of erosion and soil blowing. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, the hazard of erosion and an equipment limitation are management concerns. Plant competition also is a management concern. It retards the growth of desirable seedlings. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means. Laying out logging roads and skid trails on the contour and seeding bare logging areas to grasses or to a grass-legume mixture help to control erosion. Skidding logs and trees uphill with a cable and winch helps to overcome the slope. Firebreaks should be the grass type. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings or septic tank absorption fields, the slope is a limitation. Land shaping by cutting and filling helps to overcome this limitation on sites for dwellings. Installing the filter lines on the contour helps to overcome this limitation on sites for septic tank absorption fields.

The land capability classification is IVe.

261—Niota silt loam. This nearly level, poorly drained, deep soil is on broad flats on stream terraces. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, very friable silt loam about 8 inches thick. The subsurface layer is light brownish gray, mottled, very friable silt loam about 4 inches thick. The subsoil is about 33 inches thick. It is mottled. The upper part is light brownish gray, friable silty clay loam; the next part is light brownish gray, firm silty clay and reddish brown, very firm clay; and the lower part is stratified, firm, brown and reddish brown silty clay and light olive gray silty clay loam. The underlying material to a depth of 60 inches is gray, mottled, friable silt loam. In some places the soil does not have a subsurface layer. In other places, the dark surface soil is thicker and the depth to a seasonal high water table is more than 1 foot. In some areas the surface layer is lighter colored. Other areas are undrained.

Included with this soil in mapping are small areas of the somewhat poorly drained Atterberry, somewhat excessively drained Dickinson, and moderately well drained Downs soils. These soils are in the slightly higher landscape positions. They contain less clay in the upper part of the subsoil than the Niota soil. Also, Dickinson soils have a thicker dark surface soil. Included areas make up about 15 percent of the unit.

Water and air move through the upper part of the Niota soil at a very slow rate and through the lower part at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of ponding.

In areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches or subsurface drains. Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used for pasture or hay, ponding is a hazard. It can be controlled by surface drains, ditches, and surface inlet tile. Deferment of grazing when the soil is too wet helps to prevent surface compaction and deterioration of tilth. Canarygrass and alsike clover are suitable. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

274B2—Seaton silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained, deep soil is on upland ridges and on stream terraces. Individual areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface layer is dark grayish brown,

friable silt loam about 9 inches thick. The subsoil is friable silt loam about 44 inches thick. The upper part is dark yellowish brown, the next part is yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the subsoil contains more clay.

Included with this soil in mapping are small areas of the excessively drained Chelsea and well drained Lamont and Tell soils. Chelsea and Lamont soils contain more sand and less clay than the Seaton soil. Chelsea soils are in the more sloping areas. Lamont and Tell soils are in landscape positions similar to those of the Seaton soil. Tell soils contain more sand in the underlying material than the Seaton soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to hay and pasture, and to septic tank absorption fields and dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The land capability classification is IIe.

274C2—Seaton silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained, deep soil is on upland ridges and side slopes and on stream terraces. Individual areas are long and narrow and range from 3 to 80 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is friable silt loam about 44 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In some places the subsoil contains more clay. In other places, the subsoil contains less clay and free carbonates are within a depth of 36 inches. In some areas dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other areas the soil is on the less sloping ridgetops.

Included with this soil in mapping are small areas of the excessively drained Chelsea and well drained Lamont and Tell soils. Chelsea and Lamont soils contain more sand and less clay than the Seaton soil. Chelsea soils are in the more sloping areas. Lamont and Tell soils are in landscape positions similar to those of the Seaton soil. Tell soils contain more sand in the underlying material than the Seaton soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay and to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The land capability classification is IIIe.

274D2—Seaton silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained, deep soil is on side slopes in the uplands. Individual areas are irregularly shaped or elongated and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil to a depth of 60 inches is friable silt loam. The upper part is brown, the next part is dark yellowish brown, and the lower part is dark yellowish brown and mottled. In some areas the subsoil contains more clay. In other areas, the subsoil contains less clay and free carbonates are

within a depth of 36 inches. In a few places dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the excessively drained Chelsea and well drained Dubuque, Lamont, and Tell soils. Chelsea and Lamont soils contain more sand and less clay than the Seaton soil. Chelsea soils are in the more sloping areas. Lamont and Dubuque soils are in landscape positions similar to those of the Seaton soil. Dubuque soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. Tell soils contain more sand in the underlying material than the Seaton soil. They are in the less sloping areas. Included areas make up less than 15 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to septic tank absorption fields and dwellings. It is well suited to hay and pasture.

Erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by contour stripcropping, no-till farming, contour farming, and a crop rotation that includes a forage crop. A permanent cover pasture plants or hay also helps to control erosion.

If this soil is used for hay or pasture, no-till seeding methods and pasture renovation measures should be applied on the contour because of the hazard of erosion. Timely deferment of grazing, proper stocking rates, applications of fertilizer, and rotation grazing help to control erosion, improve forage production, and minimize compaction.

If this soil is used as a site for dwellings or septic tank absorption fields, the slope is a limitation. Land shaping by cutting and filling helps to overcome this limitation on sites for dwellings. Installing the filter lines on the contour helps to overcome this limitation on sites for septic tank absorption fields.

The land capability classification is IIIe.

274E2—Seaton silt loam, 15 to 25 percent slopes, eroded. This steep, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is yellowish brown, friable loam about 52 inches thick. It is mottled in the lower part. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In some areas the subsoil contains more clay. In some places dolomite limestone bedrock is at a depth of 40 to 60 inches. In other places, the subsoil contains less clay and free carbonates are within a depth of 36 inches.

Included with this soil in mapping are small areas of the excessively drained Chelsea, somewhat excessively drained Elizabeth, and well drained Lamont and Tell soils. Chelsea and Lamont soils contain more sand and less clay than the Seaton soil. Chelsea soils are in landscape positions similar to those of the Seaton soil. Lamont, Elizabeth, and Tell soils are in the less sloping areas. Elizabeth soils have dolomitic limestone bedrock within a depth of 20 inches and have a surface soil that is darker than that of the Seaton soil. Tell soils contain more sand in the underlying material than the Seaton soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid in areas of pasture or hay. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are used for pasture or hay. Some are wooded. This soil is generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope. It is poorly suited to pasture and hay. It is moderately suited to woodland and is well suited to woodland wildlife habitat.

If this soil is used for pasture or hay, no-till seeding methods and pasture renovation measures should be applied on the contour because of the hazard of erosion. Timely deferment of grazing, proper stocking rates, applications of fertilizer, and rotation grazing help to control erosion, improve forage production, and minimize compaction. The plants should not be grazed or clipped until they are sufficiently established.

In the areas used as woodland, the hazard of erosion, an equipment limitation, seedling mortality, and plant competition are the main management concerns. Measures that protect the woodland from fire and grazing help to prevent damage to the trees, maintain tree growth, and control erosion. The trees should be harvested by selective cutting. Building logging roads and skid trails on the contour or as near the contour as possible, skidding logs or trees uphill with a cable and winch, and diverting surface water from logging roads and skid trails with water bars help to control erosion. Establishing grass fire lanes and seeding all bare areas to grasses or to a grass-legume mixture after logging has been completed help to control erosion and provide food and nesting areas for wildlife. In bare areas suitable tree species should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to

support the equipment. Otherwise, ruts are likely to form. Operating equipment is somewhat hazardous because of the slope. Safety precautions when the equipment is used and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment can overturn if the uphill wheel hits tree roots. Proper site preparation consisting of weed control by chemicals and cutting of woody vegetation reduces the seedling mortality rate and helps to control plant competition.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIe.

274F—Seaton silt loam, 25 to 45 percent slopes. This very steep, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 3 inches thick. The subsurface layer is dark grayish brown, very friable silt loam about 5 inches thick. The subsoil silt loam is about 44 inches thick. The upper part is brown and very friable, and the lower part is yellowish brown and friable. The underlying material to a depth of 60 inches is grayish brown, mottled, calcareous, friable silt loam. In some places the subsoil contains more clay. In other places, the subsoil contains less clay and free carbonates are within a depth of 36 inches. In some areas dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the excessively drained Chelsea, moderately well drained Derinda, and well drained Lacrescent and Lamont soils. Chelsea and Lamont soils contain more sand and less clay than the Seaton soil. Chelsea soils are in landscape positions similar to those of the Seaton soil. Lamont soils are in the less sloping areas. Derinda soils contain more clay than the Seaton soil and have calcareous shale bedrock at a depth of 20 to 40 inches. Lacrescent soils have a surface soil that is darker than that of the Seaton soil, have limestone cobbles, and have dolomitic limestone bedrock below a depth of 42 inches. They are on nose slopes. Included areas make up less than 10 percent of the unit.

Water and air move through the Seaton soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high. Organic matter content is moderate. The potential for frost action is high.

Most areas are wooded. Some are pastured. This soil is well suited to woodland wildlife habitat and is poorly suited to woodland. It is generally unsuited to pasture and hay and to septic tank absorption fields and dwellings because of the slope.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. The seedling mortality rate is high, and plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature nursery stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

278B—Stronghurst silt loam, 1 to 3 percent slopes. This nearly level, somewhat poorly drained, deep soil is on broad ridges in the uplands. Individual areas are irregular in shape and range from 4 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 35 inches thick. It is mottled. The upper part is brown, very friable silt loam; the next part is brown, friable silty clay loam; and the lower part is light brownish gray, friable silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, friable silt loam. In some areas the surface layer is darker. In other areas the depth to a seasonal high water table is more than 4 feet. In some places, the surface layer is darker and the depth to a seasonal high water table is more than 4 feet. In other places calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils have a dark surface soil that is thicker than that of the Stronghurst

soil. They are in the lower landscape positions. They make up less than 5 percent of the unit.

Water and air move through the Stronghurst soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard, particularly near drainageways. Also, the seasonal high water table is a limitation. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains helps to lower the water table. Grading and land shaping help to remove excess surface water. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the moderate permeability.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundations helps to overcome this limitation.

The land capability classification is IIe.

279B—Rozetta silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained, deep soil is on upland ridges and on stream terraces. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 3 inches thick. The subsoil is about 32 inches thick. It is friable. The upper part is yellowish brown silt loam, the next part is yellowish brown silty clay loam, and the lower part is brown and yellowish brown, mottled silty clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silty clay loam. In some places the surface layer is darker. In other places the depth to a seasonal high water table is more than 6 feet or less than 4 feet. In some areas calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower landscape positions. They make up about 5 percent of the unit.

Water and air move through the Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to septic tank absorption fields and dwellings.

Erosion is a hazard if this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth, minimize crusting, and control erosion.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

279C2—Rozetta silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, deep soil is on ridges in the uplands, on side slopes along drainageways in the uplands, and on stream terraces. Individual areas are irregular in shape and range from 5 to 160 acres in size.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil is about 37 inches thick. It is friable. The upper part is yellowish brown silty clay loam; the next part is yellowish brown and brown, mottled silty clay loam; and the lower part is light brownish gray, mottled silt loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam. In some places the surface layer is darker. In other places the depth to a seasonal high water table is more than 6 feet. In some areas calcareous shale bedrock is at a depth of 40 to 60 inches. In other areas the lower part of the subsoil contains more clay and sand.

Included with this soil in mapping are small areas of the moderately well drained Derinda and somewhat poorly drained Orion soils. Derinda soils have calcareous shale bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Rozetta soil. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up about 10 percent of the unit.

Water and air move through the Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to septic tank absorption fields and dwellings. It is well suited to hay and pasture.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

279D2—Rozetta silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 34 inches thick. It is mottled and friable. The upper part is yellowish brown silty clay loam, and the lower part is brown silty clay loam and silt loam. The underlying material to a depth of 60 inches is grayish brown and light brownish gray, mottled, friable silt loam. It is calcareous in the lower part. In some areas the surface layer is darker. In other areas the depth to a seasonal high water table is more than 6 feet. In some places the subsoil and underlying material have limestone cobbles. In other places calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Derinda and somewhat poorly drained Orion soils. Derinda soils have calcareous shale bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Rozetta soil. Orion soils are in the lower areas along drainageways in the uplands. They formed in alluvium. Included areas make up about 10 percent of the unit.

Water and air move through the Rozetta soil at a moderate rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to septic tank absorption fields and dwellings.

Further erosion is a hazard if this soil is used for corn, soybeans, or small grain. Also, tilth is a limitation. A crop rotation that is dominated by forage crops and a

combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the slope are limitations. Installing subsurface tile drains helps to lower the water table. Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The shrink-swell potential and the slope also are limitations on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

280B2—Fayette silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained, deep soil is on ridges in the uplands. Individual areas are irregularly shaped or long and narrow and range from 3 to 60 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is about 40 inches thick. It is friable. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown silty clay loam and silt loam. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, friable silt loam. In some areas, the surface layer is darker and the seasonal high water table is at a depth of 4 to 6 feet. In other areas the subsoil contains less clay. In some places dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other places the depth to a seasonal high water table is 4 to 6 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Stronghurst soils. These soils are in the lower landscape positions. They make up less than 5 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate in the subsoil. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to hay and pasture, and to septic tank absorption fields. It is moderately suited to dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings to below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained, deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 6 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown and friable. The upper part is silty clay loam, and the lower part is mottled silty clay loam and silt loam. In some places, the surface layer is darker and the seasonal high water table is at a depth of 4 to 6 feet. In other places the subsoil contains less clay. In some areas dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other areas the depth to a seasonal high water table is 4 to 6 feet.

Included with this soil in mapping are small areas of the well drained Dubuque and somewhat poorly drained

Orion soils. Dubuque soils are on the more narrow ridges. They have dolomitic limestone bedrock at a depth of 20 to 40 inches. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up less than 5 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture and to septic tank absorption fields. It is moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

280D2—Fayette silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is brown, very friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown and friable. The upper part is silt loam, the next part is silty clay loam, and the lower part is mottled silty clay loam and silt loam. In some places the depth to a seasonal high water table is 4 to 6 feet. In other places dolomitic limestone bedrock is at a depth of 40 to 60 inches. In some areas the lower part of the subsoil and the underlying material have limestone cobbles. In other areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the well drained Dubuque and somewhat poorly drained Orion soils. Dubuque soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in the lower landscape positions. Orion soils formed in alluvium. They are in the lower areas along drainageways. Included areas make up less than 5 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to septic tank absorption fields and dwellings. It is well suited to hay and pasture.

Further erosion is a hazard if this soil is used for corn, soybeans, or small grain. Also, tilth is a limitation. A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The slope is a limitation if the more sloping areas of this soil are used as sites for septic tank absorption fields. Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome this limitation.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

280E2—Fayette silt loam, 15 to 25 percent slopes, eroded. This steep, well drained, deep soil is on side slopes along drainageways in the uplands. Individual

areas are long and narrow and range from 2 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 38 inches thick. It is yellowish brown and friable. The upper part is silty clay loam, and the lower part is silt loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In some areas dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other areas the lower part of the subsoil and the underlying material have limestone cobbles. In some places free carbonates are within a depth of 40 inches. In other places the subsoil contains less clay.

Included with this soil in mapping are small areas of the well drained Dubuque and somewhat poorly drained Orion soils. Dubuque soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in the lower landscape positions. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in areas of pasture or hay. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for pasture or hay. Some are wooded. This soil is poorly suited to pasture and hay. It is generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope. It is well suited to woodland wildlife habitat and is moderately suited to woodland.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help to keep the pasture in good condition. A no-till method of pasture renovation or seeding helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The plants should not be grazed until they are sufficiently established.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is Vle.

280F—Fayette silt loam, 25 to 40 percent slopes. This very steep, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow and range from 10 to 50 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is yellowish brown and friable. The upper part is silty clay loam, and the lower part is mottled silt loam. In some areas the subsoil contains less clay. In other areas free carbonates are within a depth of 40 inches. In some places the lower part of the subsoil and the underlying material have limestone cobbles. In other places dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek, well drained Lacrescent, and somewhat poorly drained Orion soils. Beavercreek soils formed in alluvium and colluvium. Orion soils formed in alluvium. Lacrescent soils formed in loess and colluvium, have a dark surface soil, and have dolomitic limestone bedrock below a depth of 42 inches. Included areas make up less than 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are wooded. Some are pastured. This soil is moderately suited to woodland and is well suited to woodland wildlife habitat. It is generally unsuited to cultivated crops, to pasture and hay, and to septic tank absorption fields and dwellings because of the slope.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. The seedling mortality rate is high, and plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees

uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature nursery stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

386B—Downs silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained, deep soil is on upland ridges and on stream terraces. Individual areas are irregular in shape and range from 2 to 70 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 34 inches thick. It is friable. The upper part is dark yellowish brown silt loam and silty clay loam; the next part is yellowish brown, mottled silty clay loam; and the lower part is mottled yellowish brown and light brownish gray silt loam. The underlying material to a depth of 60 inches is brownish yellow and light brownish gray, mottled, friable silt loam. In some areas the dark surface soil is thicker. In other areas the lower part of the subsoil has more sand and clay. In some places calcareous shale bedrock is at a depth of 40 to 60 inches. In other places the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils have a dark surface soil that is thicker than that of the Downs soil. They are in the lower landscape positions. They make up less than 10 percent of the unit.

Water and air move through the Downs soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to septic tank absorption fields and dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

386C2—Downs silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, deep soil is on ridges in the uplands, on side slopes along drainageways in the uplands, and on high stream terraces. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil is friable silty clay loam about 46 inches thick. The upper part is brown and yellowish brown, and the lower part is yellowish brown and brown and is mottled. The underlying material to a depth of 60 inches is brown, mottled, friable silt loam. In some places the surface layer is lighter colored. In other places the dark surface soil is thicker. In some areas calcareous shale bedrock is at a depth of 40 to 60 inches. In other areas dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion and poorly drained Sable soils. Orion soils are in the lower areas along

drainageways. They formed in alluvium. Sable soils are in the lower landscape positions. Included areas make up less than 10 percent of the unit.

Water and air move through the Downs soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to septic tank absorption fields and dwellings. It is well suited to hay and pasture.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains helps to lower the water table.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

403D—Elizabeth silt loam, 7 to 15 percent slopes. This strongly sloping, somewhat excessively drained, shallow soil is on ridges in the uplands. Individual areas are irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 6 inches thick. The subsurface layer is about 13 inches thick. The upper part is very dark grayish brown, calcareous, friable cobbly silt loam, and the lower part is dark brown, calcareous, friable, extremely cobbly loam. Fractured dolomitic limestone bedrock is at a depth of about 19 inches. It has some dark silt loam in the cracks. In some areas the fractured dolomitic limestone bedrock is at the surface.

Included with this soil in mapping are small areas of the well drained Dubuque, Dunbarton, Lacrescent, and NewGlarus soils. Dubuque, Dunbarton, and NewGlarus soils are in the slightly higher, more stable areas. They have a surface soil that is lighter colored than that of the Elizabeth soil. Dubuque and NewGlarus soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. Dunbarton soils contain more clay in the subsoil than the Elizabeth soil. Lacrescent soils have dolomitic limestone bedrock at a depth of more than 42 inches. They are in the lower, more sloping areas. Included areas make up less than 10 percent of the unit.

Water and air move through the Elizabeth soil at a moderate rate. Surface runoff is rapid in pastured areas. Available water capacity is very low. Organic matter content is moderate. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas are used as woodland or pasture. This soil is generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the depth to bedrock. It is poorly suited to pasture.

In the areas used as pasture, erosion and drought are hazards. Rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion. Pasture renovation is impractical because of cobbles and bedrock at or near the surface.

If this soil is used as woodland, seedling mortality is a management concern. It is caused by the very low available water capacity. The seedling mortality rate can be reduced by planting nursery stock that is larger than is typical, by planting in furrows, and by mulching. Competing vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and low fertility. The habitat should be protected from fire and grazing.

The land capability classification is VIs.

417B—Derinda silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained, moderately deep soil is on narrow ridges in the uplands. Individual

areas are irregularly shaped or long and narrow and range from 2 to 20 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil is about 20 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is pale olive, mottled, firm silty clay. Pale olive, mottled, calcareous, very firm silty clay shale bedrock is at a depth of about 32 inches. In some places the depth to shale residuum is less than 15 inches. In other places the surface soil is darker. In some areas the seasonal high water table is within a depth of 2.5 feet. In other areas the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Appleriver soils. These soils are in the broader areas. They have a seasonal high water table within a depth of 2.5 feet. They make up 5 to 10 percent of the unit.

Water and air move through the Derinda soil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

Erosion is a hazard if this soil is used for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain tilth and control erosion.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIe.

417C2—Derinda silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, moderately deep soil is on ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 21 inches thick. The upper part is yellowish brown, friable silty clay loam; the next part is light olive brown, mottled, firm silty clay; and the lower part is mottled light olive brown and light olive gray, very firm silty clay. Greenish gray, mottled, calcareous, very firm silty clay shale bedrock is at a depth of about 30 inches. In some areas the depth to shale residuum is less than 15 inches. In other areas the surface layer is darker. In severely eroded areas the subsoil is exposed. In places the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Rozetta soils. These soils formed entirely in loess. They are in landscape positions similar to those of the Derinda soil. They make up 5 to 10 percent of the unit.

Water and air move through the Derinda soil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. Erosion can be controlled by a crop rotation that includes 1 or more years of forage crops, by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, and by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil.

Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

417D2—Derinda silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained, moderately deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is about 27 inches thick. The upper part is yellowish brown, mottled, friable silty clay loam; the next part is pale olive, mottled, calcareous, firm silty clay; and the lower part is light olive gray, calcareous, firm silty clay. Light olive gray, calcareous, firm silty clay shale bedrock is at a depth of about 35 inches. In some areas the surface layer is darker. In other areas the depth to shale residuum is less than 15 inches. In places limestone cobbles are above the shale residuum. In severely eroded areas the subsoil is exposed. In some areas the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Rozetta, well drained Lamoille, and somewhat poorly drained Orion soils. Lamoille soils are in the slightly higher landscape positions. They have limestone cobbles in the lower part of the subsoil and in the underlying material. Orion soils are in the lower areas along drainageways. They formed in alluvium. Rozetta soils formed entirely in loess. They are in landscape positions similar to those of the Derinda soil. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Derinda soil at a slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is poorly suited to cultivated crops and to septic tank absorption fields. It is moderately suited to hay and pasture and to dwellings.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IVe.

417E2—Derinda silt loam, 15 to 25 percent slopes, eroded. This steep, moderately well drained, moderately deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 35 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is

about 26 inches thick. The upper part is brown and yellowish brown, friable silty clay loam, and the lower part is mottled pale yellow and yellow, calcareous, firm silty clay. Mottled pale yellow and yellow, calcareous, very firm silty clay shale bedrock is at a depth of about 34 inches. In some areas the surface layer is darker. In other areas the depth to shale residuum is less than 15 inches. In some places limestone cobbles are above the shale residuum. In other places the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the well drained Lamoille and somewhat poorly drained Orion soils. Lamoille soils are in the slightly higher areas. They have limestone cobbles in the lower part of the subsoil and in the underlying material. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Derinda soil at a slow rate. Surface runoff is rapid in pastured areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or hay. Some are wooded. This soil is generally unsuited to cultivated crops, to pasture and hay, and to septic tank absorption fields and dwellings because of the slope. It is moderately suited to woodland and is well suited to woodland wildlife habitat.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

417F—Derinda silt loam, 25 to 45 percent slopes. This very steep, moderately well drained, moderately deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 35 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is brown, friable silt loam about 6 inches thick. The subsoil is about 21 inches thick. The upper part is yellowish brown, friable silty clay loam; the next part is mottled pale olive and brown, calcareous, firm silty clay; and the lower part is pale olive, mottled, calcareous, very firm silty clay. Pale olive, mottled, calcareous, very firm silty clay shale bedrock is at a depth of about 31 inches. In some areas the depth to shale residuum is less than 15 inches. In other areas limestone cobbles are above the residuum. In places the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the well drained Lamoille and somewhat poorly drained Orion soils. Lamoille soils are in the slightly higher areas. They have limestone cobbles in the lower part of the subsoil and in the underlying material. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Derinda soil at a slow rate. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Surface runoff is rapid in wooded areas. Available water capacity is low. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are wooded. Some are pastured. This soil is moderately suited to woodland and is well suited to woodland wildlife habitat. It is generally unsuited to cultivated crops, to pasture and hay, and to septic tank absorption fields and dwellings because of the slope.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of

the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

418B—Schapville silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained, moderately deep soil is on narrow ridges in the uplands. Individual areas are irregularly shaped or long and narrow and range from 2 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil is about 20 inches thick. In sequence downward, it is dark yellowish brown, friable silty clay loam; dark yellowish brown, mottled, friable silty clay loam; brown, mottled, firm silty clay loam; and light yellowish brown, mottled, very firm clay. Yellow and light gray, mottled, calcareous, very firm shale bedrock is at a depth of about 30 inches. In some places the depth to shale residuum is less than 15 inches. In other places the surface soil is lighter colored. In some areas the seasonal high water table is within a depth of 2.5 feet. In other areas the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Loran soils. These soils are in the lower landscape positions. They have calcareous shale bedrock at a depth of more than 40 inches. They make up less than 5 percent of the unit.

Water and air move through the upper part of the Schapville soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderately high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

Erosion is a hazard if this soil is used for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain tilth and control erosion.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIe.

418C2—Schapville silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, moderately deep soil is on ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 45 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 26 inches thick. The upper part is dark brown and yellowish brown, friable silty clay loam; the next part is yellowish brown, mottled, firm silty clay loam; and the lower part is mottled pale olive, light brownish gray, and yellowish brown, firm, calcareous silty clay. Pale olive and light brownish gray, mottled, calcareous, firm silty clay shale bedrock is at a depth of about 34 inches. In some areas the surface layer is lighter colored. In some places the depth to shale residuum is less than 15 inches. In other places the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion soils. These soils are in the lower areas along drainageways. They formed in alluvium. They make up less than 5 percent of the unit.

Water and air move through the upper part of the Schapville soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. Erosion can be controlled by a crop rotation that includes 1 or more years of forage crops, by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, and by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

418D2—Schapville silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained, moderately deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 19 inches thick. The upper part is dark brown and brown, friable silty clay loam; the next part is brown, mottled, firm silty clay loam; and the lower part is light yellowish brown, mottled, calcareous, very firm silty clay. Mottled yellowish brown and light gray, calcareous, very firm silty clay shale bedrock is at a depth of about 27 inches. In some places the surface layer is lighter colored. In other places the depth to shale residuum is less than 15 inches. In some areas limestone cobbles are above the shale residuum. In other areas calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of Massbach soils and small areas of the somewhat poorly drained Orion soils. Massbach soils are in landscape positions similar to those of the Schapville soil. They have calcareous shale bedrock at a depth of 40 to 60 inches. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up less than 5 percent of the unit.

Water and air move through the upper part of the Schapville soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 2.5 to 4.0 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are cultivated. This soil is poorly suited to cultivated crops and to septic tank absorption fields. It is moderately suited to hay and pasture and to dwellings.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the

structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IVe.

419B2—Flagg silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained, deep soil is on the tops of ridges in the uplands. Individual areas are irregularly shaped or long and narrow and range from 40 to 160 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown and yellowish brown, friable silt loam and silty clay loam, and the lower part is brown and yellowish red, firm silty clay loam and sandy clay loam. In some areas the lower part of the subsoil contains more clay. In a few areas it contains more chert. In some places dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other places the depth to glacial till is more than 60 inches.

Included with this soil in mapping are small areas of poorly drained soils in the lower landscape positions. These soils make up less than 5 percent of the unit.

Water and air move through the Flagg soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to septic tank absorption fields and dwellings.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome this limitation.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

419C2—Flagg silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained, deep soil is on ridgetops and side slopes in the uplands. Individual areas are irregularly shaped or long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is yellowish brown, friable silty clay loam, and the lower part is strong brown and yellowish red, friable clay loam. In some areas the lower part of the subsoil contains more clay. In a few areas it contains more chert. In some places dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other places the underlying glacial till is brown or gray.

Included with this soil in mapping are small areas of the well drained Miami and NewGlarus soils. Miami soils are in the more sloping areas. They have glacial till within a depth of 20 inches. NewGlarus soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in the lower landscape positions. Included areas make up less than 10 percent of the unit.

Water and air move through the Flagg soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is moderately suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated

helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome this limitation.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

429B2—Palsgrove silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained, deep soil is on narrow ridges in the uplands. Individual areas are long and narrow or irregularly shaped and range from 2 to 50 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 48 inches thick. The upper part is yellowish brown, friable silt loam and silty clay loam; the next part is yellowish brown, mottled, friable silty clay loam; and the lower part is mottled reddish brown, yellowish red, and brown, calcareous, firm silty clay. Brownish yellow dolomitic limestone bedrock is at a depth of about 57 inches. In some areas the depth to dolomitic limestone bedrock is more than 60 inches. In other areas, the seasonal high water table is within a depth of 6 feet and calcareous shale bedrock is at a depth of 40 to 60 inches. In places, the lower part of the subsoil contains more sand and less clay and the depth to dolomitic limestone bedrock is more than 60 inches.

Included with this soil in mapping are small areas of the well drained Dubuque and NewGlarus soils. These soils are in the more sloping areas. They have dolomitic limestone bedrock at a depth of 20 to 40 inches. They make up less than 5 percent of the unit.

Water and air move through the upper part of the Palsgrove soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

In areas used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Incorporation of crop residue into the soil or additions of other organic material help to prevent crusting and improve tilth. A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIe.

429C2—Palsgrove silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained, deep soil is on side slopes and ridgetops in the uplands. Individual areas are irregular in shape and range from 2 to 50 acres in size.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is about 42 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is strong brown, firm silty clay. Dolomitic limestone bedrock is at a depth of about 50 inches. In some areas the depth to dolomitic limestone bedrock is more than 60 inches. In other areas, calcareous shale bedrock is at a depth of 40 to 60 inches and the seasonal high water table is within a depth of 6 feet. In places, the lower part of the subsoil contains more sand and less clay and the depth to dolomitic limestone bedrock is more than 60 inches.

Included with this soil in mapping are small areas of the well drained Dubuque, Dunbarton, and NewGlarus soils in the lower landscape positions. Dubuque and NewGlarus soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. Dunbarton soils have dolomitic limestone bedrock within a depth of 20 inches.

Included areas make up less than 10 percent of the unit.

Water and air move through the upper part of the Palsgrove soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

429D2—Palsgrove silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregularly shaped or long and narrow and range from 2 to 60 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 48 inches thick. The upper part is brown and yellowish brown, friable silt loam and silty clay loam; the next part is yellowish brown, mottled, friable silty clay loam and silt loam; and the lower part is reddish brown, very friable silty clay loam. Brownish yellow dolomitic limestone bedrock is at a depth of about 56 inches. In a few areas the depth to dolomitic limestone bedrock is more than 60 inches. In some areas, dolomitic limestone bedrock is at a depth of more than 60 inches and the lower part of the subsoil contains more sand and less clay. In places, calcareous shale bedrock is at a depth of 40 to 60 inches and the seasonal high water table is within a depth of 6 feet.

Included with this soil in mapping are small areas of the well drained Dubuque, Dunbarton, and NewGlarus soils and the somewhat poorly drained Orion soils. Dubuque and NewGlarus soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Palsgrove soil. Dunbarton soils have dolomitic limestone bedrock within a depth of 20 inches. They are near the points of ridges. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up less than 10 percent of the unit.

Water and air move through the upper part of the Palsgrove soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the slow permeability are

limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

429E2—Palsgrove silt loam, 15 to 25 percent slopes, eroded. This steep, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are long and narrow or irregularly shaped and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 48 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is dark brown and reddish brown, mottled, firm silty clay. Yellow dolomitic limestone bedrock is at a depth of about 57 inches. In some areas the depth to dolomitic limestone bedrock is more than 60 inches. In other areas, the seasonal high water table is within a depth of 6 feet and calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek, well drained Dubuque and Dunbarton, and somewhat excessively drained Elizabeth soils. Beavercreek soils formed in alluvium and colluvium. They are in the lower areas along drainageways. Dubuque soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Palsgrove soil. Dunbarton and Elizabeth soils are near the points of ridges. They have dolomitic limestone bedrock within a depth of 20 inches. Also, Elizabeth soils have a surface soil that is darker than that of the Palsgrove soil. Included areas make up about 10 percent of the unit.

Water and air move through the upper part of the Palsgrove soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in areas of pasture or hay. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for pasture or hay. Some are wooded. This soil is generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope. It is poorly suited to pasture and hay. It is moderately suited to woodland and is well suited to woodland wildlife habitat.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help to keep the pasture in good condition. A no-till method of pasture renovation or seeding helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The plants should not be grazed until they are sufficiently established.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIe.

536—Dumps, mine. This map unit consists of nearly level to very steep, deep accumulations of mine refuse, mainly in the northwestern part of the county. Individual areas are irregularly shaped or fan shaped and range from 2 to 60 acres in size.

The material consists of gravel-sized limestone fragments and sand-sized material in the refuse piles and silty sediments in depressions. It is generally several feet thick. It is dominantly gray and brown. The entire unit is extremely alkaline. It includes abandoned buildings, scattered areas of debris, and haulage roads. Also included are escarpments near the edge of the unit, adjacent to natural soils. The unit supports little or no vegetation.

Included in this unit in mapping are areas of Orthents, silty, and natural soils around the edges of

the unit. These soils support trees and grasses. The natural soils are in undisturbed areas, and the silty Orthents are in areas of overburden. Included areas make up about 10 percent of the unit.

Surface runoff is very rapid to ponded in the dumps. The runoff is toxic to most plants because of a high content of lead and high alkalinity. The material is easily eroded. The depressional areas are wet.

One area north of Galena is used as a source of road-building material. The other areas remain idle. This unit is generally unsuited to nearly all uses. The major hazards are erosion and toxic runoff in the more sloping areas, in areas at a higher elevation than a drainageway, in areas of cropland, and in areas of deep water. Wetness is a limitation in the depressions. Reclamation requires grading, land shaping, and additions of natural soil material that can support vegetation. The feasibility and extent of reclamation depend on the condition determined by onsite investigation and the particular use intended.

No land capability classification has been assigned to this unit.

540C2—Frankville silt loam, 4 to 10 percent slopes, eroded. This sloping, well drained, moderately deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 27 inches thick. The upper part is brown, friable silt loam; the next part is dark yellowish brown and yellowish brown, friable silty clay loam; and the lower part is brown, very firm silty clay. Brownish yellow dolomitic limestone bedrock at a depth of about 34 inches. In some places the dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other places the surface layer is lighter colored. In some areas the layer of residuum is thicker.

Included with this soil in mapping are small areas of the moderately well drained Elco and somewhat excessively drained Elizabeth soils. Elco soils are in the slightly higher areas at the head of drainageways. They have glacial till at a depth of 20 to 40 inches and do not have bedrock within a depth of 60 inches. Elizabeth soils are in more sloping areas near the points of ridgetops. They have dolomitic limestone bedrock within a depth of 20 inches. Included areas make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Frankville soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and to dwellings with basements. It is moderately suited to dwellings without basements.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

547C2—Eleroy silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, deep soil is on ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 45 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 41 inches thick. The upper part is yellowish brown, firm silty clay loam; the next part is yellowish brown and brown, mottled, firm silty clay loam; and the lower part is light gray, mottled, very firm, calcareous silty clay. Light gray, mottled, calcareous, very firm silty

clay shale bedrock is at a depth of about 52 inches. In some areas the depth to calcareous shale bedrock is more than 60 inches. In other areas the depth to a seasonal high water table is less than 2.5 feet. In a few places dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other places the subsoil has less clay and more sand.

Included with this soil in mapping are small areas of the moderately well drained Derinda and somewhat poorly drained Orion soils. Derinda soils are in landscape positions similar to those of the Eleroy soil. They have calcareous shale bedrock at a depth of 20 to 40 inches. Orion soils are in the lower areas along drainageways. They formed in alluvium. Included areas make up less than 10 percent of the unit.

Water and air move through the upper part of the Eleroy soil at a moderate rate and through the lower part of the subsoil at a very slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. Erosion can be controlled by a crop rotation that includes 1 or more years of forage crops, by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, and by terraces. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table, the very slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed and the site is leveled.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

547D2—Eleroy silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained, deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are long and narrow or irregularly shaped and range from 2 to 45 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 40 inches thick. The upper part is yellowish brown, friable silty clay loam; the next part is brown, mottled, friable silty clay loam and silt loam; and the lower part is light olive gray, mottled, calcareous, firm silty clay loam. Light olive gray, calcareous, firm silty clay loam shale bedrock is at a depth of about 46 inches. In a few areas the depth to calcareous material is more than 60 inches. In some areas, the lower part of the subsoil and the underlying material have limestone cobbles and the depth to calcareous shale bedrock is more than 60 inches. In places dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek and Derinda and somewhat poorly drained Orion soils. Beavercreek and Orion soils are in the lower areas along drainageways. Beavercreek soils formed in alluvium and colluvium. Orion soils formed in alluvium. Derinda soils are in landscape positions similar to those of the Eleroy soil. They have calcareous shale bedrock at a depth of 20 to 40 inches. Included areas make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Eleroy soil at a moderate rate and through the lower part of the subsoil at a very slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water is 2.5 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is

dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table, the very slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed and the site is leveled.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The shrink-swell potential and the slope also are limitations on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

547E2—Eleroy silt loam, 15 to 25 percent slopes, eroded. This steep, moderately well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregularly shaped or long and narrow and range from 2 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 46 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is mottled olive, brown, and yellowish brown, calcareous, firm silty clay loam and silty clay. Light yellowish brown, mottled, calcareous, very firm silty clay shale bedrock is at a depth of about 53 inches. In some areas, the lower part of the subsoil and the underlying material have limestone cobbles and the depth to calcareous shale bedrock is more than 60 inches. In other areas dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek and Derinda and well drained Dubuque soils. Beavercreek soils are in the lower areas along drainageways. They formed in alluvium and colluvium. Derinda soils are landscape positions similar to those of the Eleroy soil. They have calcareous shale bedrock at a depth of 20 to 40 inches. Dubuque soils are on the lower side slopes. They have dolomitic limestone bedrock at a depth of 20 to 40 inches. Included areas make up about 10 percent of the unit.

Water and air move through the upper part of the Eleroy soil at a moderate rate and through the lower part of the subsoil at a very slow rate. Surface runoff is rapid in areas of pasture or hay. The seasonal high water table is 2.5 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are used for pasture or hay. Some are wooded. This soil is moderately suited to woodland and is well suited to woodland wildlife habitat. It is poorly suited to pasture and hay. It is generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help to keep the pasture in good condition. A no-till method of pasture renovation or seeding helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. The plants should not be grazed until they are sufficiently established.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult

because of the slope and the hazard of erosion.

The land capability classification is VIe.

565B—Tell silt loam, 2 to 5 percent slopes. This gently sloping, well drained, deep soil is on ridges in the uplands and on high stream terraces. Individual areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 26 inches thick. The upper part is brown, friable silt loam, and the lower part is brown, very friable sandy loam. The underlying material to a depth of 60 inches is stratified, loose, dark yellowish brown fine sand and brown loamy sand. In places the surface layer is darker. In some areas the upper part of the subsoil has more sand. In other areas it has more clay.

Included with this soil in mapping are small areas of the excessively drained Chelsea and well drained Lamont and Seaton soils. Chelsea and Lamont soils contain more sand in the surface soil and in the upper part of the subsoil than the Tell soil. Chelsea soils are in the more sloping areas. Lamont and Seaton soils are in landscape positions similar to those of the Tell soil. Seaton soils contain less sand in the lower part of the subsoil than the Tell soil. Included areas make up less than 15 percent of the unit.

Water and air move through the upper part of the Tell soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields. It is well suited to dwellings with basements and moderately suited to dwellings without basements.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion and conserve moisture. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. The site should be leveled. Filling or mounding with suitable material increases the filtering capacity of the field.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

565C2—Tell silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained, deep soil is on side slopes in the uplands and on high stream terraces. Individual areas are irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is dark brown, very friable silt loam about 8 inches thick. The subsoil is about 16 inches thick. It is dark yellowish brown and friable. The upper part is silt loam, and the lower part is loam. The underlying material extends to a depth of 60 inches. The upper part is dark yellowish brown and yellowish brown, loose loamy sand, and the lower part is stratified, loose, yellowish brown sand and brown loamy sand. In some areas the upper part of the subsoil contains more clay. In other areas it contains more sand. In places the surface layer is darker.

Included with this soil in mapping are small areas of the excessively drained Chelsea and well drained Lamont and Seaton soils. Chelsea and Lamont soils contain more sand in the surface soil and in upper part of the subsoil than the Tell soil. Chelsea soils are in the more sloping areas. Lamont and Seaton soils are in landscape positions similar to those of the Tell soil. Seaton soils contain less sand in the lower part of the subsoil and in the underlying material than the Tell soil. Included areas make up less than 15 percent of the unit.

Water and air move through the upper part of the Tell soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields. It is well suited to dwellings with basements and moderately suited to dwellings without basements.

If this soil is used for corn, soybeans, or small grain,

erosion and soil blowing are hazards. Also, the moderate available water capacity and the level of fertility are limitations. Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, and by terraces. Field windbreaks and a tillage system that leaves the surface rough help to control soil blowing. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. The site should be leveled. Filling or mounding with suitable material increases the filtering capacity of the field.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

569C2—Medary silty clay loam, 3 to 12 percent slopes, eroded. This sloping, moderately well drained, deep soil is on side slopes on high stream terraces. Individual areas are irregular in shape and range from 5 to more than 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 40 inches thick. The upper part is grayish brown, friable silty clay loam; the next part is brown, reddish brown, and pinkish gray, mottled, firm silty clay; and the lower part is light brownish gray, mottled, friable, stratified silty clay loam and silt loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable, stratified silty clay loam, silt loam, and loam. In places the surface layer contains more clay.

Included with this soil in mapping are small areas of the moderately well drained Downs and Rozetta and poorly drained Zwingle soils. Downs and Rozetta soils are in the higher landscape positions. They contain less clay in the subsoil than the Medary soil. Also, Downs soils have a darker surface layer. Zwingle soils are in the less sloping areas. Included areas make up less than 10 percent of the unit.

Water and air move through the Medary soil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 2.5 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a problem. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Establishing pasture and hay crops helps to control erosion. Seedbed preparation is difficult in areas on severely eroded side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. The plants should not be grazed until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

The seasonal high water table, the slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability. Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome the slope.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

569F2—Medary silty clay loam, 15 to 45 percent slopes, eroded. This very steep, moderately well drained, deep soil is on the side slopes of high stream terraces. Individual areas are irregularly shaped or long and narrow and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 41 inches thick. In sequence downward, it is reddish brown, firm clay; brown, mottled silty clay; stratified, reddish brown, mottled, firm silty clay, light olive brown silty clay loam, and light brownish gray silt loam; and stratified, strong brown and light brownish gray, friable silt loam and reddish brown silty clay. The underlying material to a depth of 60 inches is stratified, friable, calcareous, strong brown and light brownish gray silt loam and dark reddish brown and dark reddish gray silty clay. In places the surface soil contains more clay.

Included with this soil in mapping are small areas of the well drained Seaton and somewhat poorly drained Wakeland soils. Seaton soils contain less clay in the subsoil than the Medary soil. They are in landscape positions similar to those of the Medary soil. Wakeland soils formed in alluvium and contain less clay throughout than the Medary soil. They are in the lower areas along drainageways. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Medary soil at a slow rate. Surface runoff is rapid in wooded areas. The seasonal high water table is 2.5 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are wooded. Some are pastured. This soil is poorly suited to woodland and is well suited to woodland wildlife habitat. It is generally unsuited to cultivated crops, to pasture and hay, and to septic tank absorption fields and dwellings because of the slope.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

572B—Loran silty clay loam, 3 to 7 percent slopes. This gently sloping, somewhat poorly drained, deep soil is on ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer is very dark grayish brown, mottled, friable silty clay loam about 5 inches thick. The subsoil is about 26 inches thick. It is friable. The upper part is olive brown silty clay loam; the next part is light olive brown, mottled silty clay loam and silt loam; and the lower part is pale yellow, mottled, calcareous silty clay loam. Light brownish gray, calcareous shale bedrock is at a depth of about 41 inches. In some places the depth to calcareous shale bedrock is more than 60 inches. In other places the dark surface soil is thinner. In some areas the residuum contains more clay. In other areas it contains more sand.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Shullsburg soils. Sable soils are in the lower areas. They formed entirely in loess. Shullsburg soils have calcareous shale bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Loran soil. Included areas make up about 15 percent of the unit.

Water and air move through the Loran soil at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. Erosion can be controlled by a crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the restricted permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the restricted permeability.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundations helps to lower the seasonal high water table.

The land capability classification is IIe.

576—Zwingle silt loam. This nearly level, poorly drained, deep soil is on broad flats on stream terraces. Individual areas are irregular in shape and range from 5 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer also is dark grayish brown, friable silt loam. It is about 3 inches thick. The subsoil is about 30 inches thick. It is mottled and firm. The upper part is grayish brown silty clay and clay, and the lower part is reddish brown silty clay and silty clay loam. The underlying material extends to a depth of 60 inches. It is mottled. The upper part is light brownish gray, strong brown, and grayish brown, firm silty clay, and the lower part is stratified, friable, light brownish gray silt loam, yellowish brown fine sandy loam, and reddish brown silty clay loam and silty clay. In some places the surface layer is darker. In other places the soil has a darker surface soil and contains less clay in the subsoil. Some areas are undrained.

Included with this soil in mapping are small areas of the moderately well drained Downs and Medary soils. Downs soils are in the higher landscape positions. They contain less clay in the subsoil than the Zwingle soil. Also, they have a darker surface layer. Medary soils are in the more sloping areas. Included areas make up less than 10 percent of the unit.

Water and air move through the Zwingle soil at a very slow rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is 1 to 2 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of ponding.

In areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. The wetness can be reduced by surface ditches or subsurface drains. Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used for pasture or hay, ponding is a hazard. It can be controlled by surface drains, ditches, and surface inlet tile. Deferred grazing when the soil is too wet helps to prevent surface compaction and deterioration of tilth. Canarygrass and alsike clover are suitable. The suitable warm-season grasses include big bluestem, indiangrass, and switchgrass. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

681E—Dubuque-Orthents-Fayette complex, 12 to 25 percent slopes, pitted. These rolling and hilly, well drained soils are on ridgetops and side slopes in the uplands. The landscape is hummocky because of hand-dug lead and zinc mines, which are 3 to 5 feet deep and 20 to 30 feet in diameter. The moderately deep Dubuque soil is in the lower, more sloping areas; the deep Fayette soil is in the higher, less sloping areas; and the deep Orthents are in areas throughout the unit. The unit is about 40 percent Dubuque soil, 30 percent Orthents, and 20 percent Fayette soil. Individual areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer of the Dubuque soil is very dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 21 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is brown and strong brown, firm silty clay. Yellow dolomitic limestone bedrock is at a depth of about 33 inches. In some places the layer of residuum is thicker. In other places slopes are more than 25 percent. In some areas the dolomitic limestone bedrock is at a depth of 40 to 60 inches.

Typically, the surface layer of the Orthents is very dark grayish brown to yellowish brown, friable silt loam and silty clay loam having scattered gravel and cobbles

throughout. The underlying material to a depth of 60 inches is a mixture of brown to yellowish brown, loamy overburden that has scattered gravel and cobbles throughout. In some areas the underlying material is a buried soil.

Typically, the surface layer of the Fayette soil is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is dark grayish brown and brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is yellowish brown silty clay loam, and the lower part is yellowish brown, mottled silty clay loam and silt loam. In a few areas the soil has a darker surface layer and has a seasonal high water table at a depth of 4 to 6 feet. In some areas the soil has clay in the lower part of the subsoil and has dolomitic limestone bedrock at a depth of 40 to 60 inches. In places the seasonal high water table is at a depth of 4 to 6 feet.

Included with these soils in mapping are small areas of the moderately well drained Beavercreek, well drained Dunbarton and Lacrescent, and somewhat excessively drained Elizabeth soils and small areas of mine shafts. Beavercreek soils formed in alluvium and colluvium. They are in the lower areas along drainageways. Dunbarton and Elizabeth soils are near the points of ridgetops. They have dolomitic limestone bedrock within a depth of 20 inches. Also, Dunbarton soils contain more clay than the Dubuque and Fayette soils and the Orthents, and Elizabeth soils have a darker surface soil. Lacrescent soils have limestone colluvium throughout, have dolomitic limestone bedrock at a depth of more than 42 inches, and have a dark surface soil. They are in the more sloping areas. The mine shafts are in landscape positions similar to those of the Dubuque and Fayette soils and the Orthents. They are 50 to 100 feet deep. Included areas make up about 10 percent of the unit.

Water and air move through the upper part of the Dubuque soil at a moderate rate and through the lower part of the subsoil at a slow rate. They move through the Fayette soil at a moderate rate. The movement of water and air varies widely in the Orthents because the texture varies from place to place. Surface runoff is medium in wooded areas. Available water capacity is moderate in the Dubuque soil, moderate or high in the Orthents, and very high in the Fayette soil. Organic matter content is moderately low in the Dubuque and Fayette soils and low in the Orthents. The shrink-swell potential is high in the Dubuque soil and moderate in the Fayette soil. The potential for frost action is high in the Dubuque and Fayette soils.

Most areas are wooded or pastured. Some reclaimed areas are used for hay or cultivated crops. The Dubuque and Fayette soils are moderately suited to woodland and well suited to woodland wildlife habitat. They are generally unsuited to cultivated crops and to pasture and hay because of the slope. The Fayette soil is moderately suited to septic tank absorption fields and dwellings, but the Dubuque soil is generally unsuited because of the slope. Onsite investigation is needed to determine the suitability of the Orthents for specific uses and the limitations affecting those uses.

In the areas used as woodland, the hazard of erosion and an equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It retards the growth of desirable seedlings. The competition from undesirable species in openings where timber has been harvested can be controlled by chemical or mechanical means. Laying out logging roads and skid trails on the contour and seeding bare logging areas to grasses or to a grass-legume mixture help to control erosion. Skidding logs and trees uphill with a cable and winch helps to overcome the slope. Firebreaks should be the grass type. Machinery should be used only when the soils are firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The slope is a limitation if the more sloping areas of the Dubuque and Fayette soils are used as sites for septic tank absorption fields. Installing the filter lines on the contour or land shaping by cutting and filling helps to overcome this limitation.

If the Dubuque and Fayette soils are used as sites for dwellings, the slope and the shrink-swell potential are limitations. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is VIe.

731B—Nasset silt loam, 2 to 5 percent slopes. This gently sloping, well drained, deep soil is on ridges in the uplands. Individual areas are long and narrow or irregularly shaped and range from 2 to 30 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsoil is about 38 inches thick. The upper part is brown, friable silt loam; the next part is dark yellowish brown and yellowish brown, friable silty clay loam; and the lower part is dark brown, firm silty clay. The underlying material is about 4

inches of reddish brown silty clay and strong brown sandy clay loam. It is firm and calcareous. Brownish yellow dolomitic limestone bedrock is at a depth of about 49 inches. In a few places the dark surface soil is thicker. In some areas the surface layer is light colored. In other areas, the depth to dolomitic limestone bedrock is more than 60 inches and the depth to a seasonal high water table is 4 to 6 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Atterberry and Muscatine and well drained Frankville soils. Atterberry and Muscatine soils formed entirely in loess. They are in the slightly lower landscape positions. Muscatine soils have a dark surface soil that is thicker than that of the Nasset soil. Frankville soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in the more sloping areas. Included areas make up about 5 percent of the unit.

Water and air move through the upper part of the Nasset soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

In areas used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Incorporation of crop residue into the soil or additions of other organic material help to prevent crusting and improve tilth. A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIe.

731C2—Nasset silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained, deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 50 inches thick. The upper part is dark yellowish brown, friable silty clay loam; the next part is brown, mottled, firm silty clay; and the lower part is yellowish brown, friable silty clay loam. Yellow dolomitic limestone bedrock is at a depth of about 58 inches. In a few areas the dark surface soil is thicker. In some areas, the depth to dolomitic bedrock is more than 60 inches and the depth to a seasonal high water table is 4 to 6 feet. In places the surface layer is lighter colored.

Included with this soil in mapping are small areas of the somewhat excessively drained Elizabeth, well drained Frankville, and somewhat poorly drained Lawson soils. Elizabeth soils have dolomitic limestone bedrock within a depth of 20 inches. They are on the points of ridges and in the more sloping areas. Frankville soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Nasset soil. Lawson soils formed in alluvium. They are in the lower areas along drainageways. Included areas make up about 10 percent of the unit.

Water and air move through the upper part of the Nasset soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after

planting, terraces, and contour farming help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

731D2—Nasset silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregularly shaped or long and narrow and range from 2 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is yellowish brown, friable silty clay loam; and the lower part is brown, firm silty clay. The underlying material is about 5 inches of strong brown, calcareous, friable silty clay and brownish yellow sand. Brownish yellow dolomitic limestone bedrock is at a depth of about 49 inches. In a few areas the dark surface soil is thicker. In some areas the surface layer is lighter colored. In places, the depth to limestone bedrock is more than 60 inches and the depth to a seasonal high water table is 4 to 6 feet.

Included with this soil in mapping are small areas of the somewhat excessively drained Elizabeth, well drained Frankville, and somewhat poorly drained Lawson soils. Elizabeth soils have dolomitic limestone bedrock within a depth of 20 inches. They are on nose slopes. Frankville soils have dolomitic limestone bedrock at a depth of 20 to 40 inches. They are on the higher, less sloping ridges. Lawson soils formed in alluvium. They are in the lower areas along drainageways. Included areas make up about 10 percent of the unit.

Water and air move through the upper part of the Nasset soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that is dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and productivity.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIIe.

732B—Appleriver silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained, deep soil is on broad ridges in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 4 inches thick. The subsoil is about 44 inches thick. The upper part is yellowish brown, mottled, friable silt loam and silty clay loam; the next part is light olive brown, mottled, firm silty clay; and the lower part is light yellowish brown, mottled, calcareous, firm silty clay. Mottled light brownish gray, yellowish brown, and greenish gray, calcareous, very firm silty clay shale bedrock is at a depth of about 50 inches. In some areas the depth to calcareous shale bedrock is more than 60 inches. In other areas the surface soil is darker. In places the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower areas. They have a surface soil that is darker than that of the Appleriver soil. They make up about 5 percent of the unit.

Water and air move through the upper part of the Appleriver soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to dwellings without basements. It is poorly suited to septic tank absorption fields and to dwellings with basements.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard, particularly near drainageways. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table, the slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed and the site is leveled.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIe.

745B—Shullsburg silt loam, 3 to 7 percent slopes. This gently sloping, somewhat poorly drained, moderately deep soil is on ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, mottled, friable silty clay loam about 6 inches thick. The subsoil is mottled silty clay about 11 inches thick. The upper part is dark grayish brown and firm, and the lower part is light olive gray, very firm, and calcareous. Light gray and greenish gray, calcareous, very firm silty clay shale bedrock is at a depth of about 24 inches. In some areas the depth to a seasonal high water table is more than 3 feet. In other areas the dark surface soil is thinner. In places the calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower landscape positions. They formed entirely in loess. They make up about 5 percent of the unit.

Water and air move through the Shullsburg soil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is low. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to control

erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soil with material that is more permeable helps to overcome the slow permeability.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. On sites for dwellings with basements, the depth to bedrock is an additional limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IIe.

753B—Massbach silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained, deep soil is on ridges in the uplands. Individual areas are long and narrow or irregularly shaped and range from 2 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 36 inches thick. The upper part is brown, friable silty clay loam; the next part is brown and yellowish brown, mottled, friable silty clay loam; and the lower part is mottled dark brown and brown, firm calcareous silty clay. Greenish gray, mottled, calcareous, firm silty clay shale bedrock is at a depth of about 49 inches. In a few areas the dark surface soil is thicker. In some areas the lower part of the subsoil contains less clay and more sand. In some places the depth to calcareous shale bedrock is more than 60 inches. In other places the soil has a thicker dark surface soil and has a seasonal high water table at a depth of 1 to 3 feet.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in the lower, less sloping areas. They formed entirely in loess. They make up less than 5 percent of the unit.

Water and air move through the upper part of the Massbach soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3 to 5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

Erosion is a hazard if this soil is used for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming help to maintain tilth and control erosion.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Subsurface tile drains can help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table, the slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed and the site is leveled.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

753C2—Massbach silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained, deep soil is on ridges and on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is very dark grayish

brown, friable silt loam about 6 inches thick. The subsoil is silty clay loam about 43 inches thick. The upper part is yellowish brown and friable; the next part is yellowish brown and brown, mottled, and friable; and the lower part is mottled light brownish gray, light yellowish brown, and yellowish brown and is firm. Light yellowish brown, mottled, calcareous, very firm silty clay shale bedrock is at a depth of about 49 inches. In some areas the dark surface soil is thicker. In other areas the soil has a thickened dark surface soil and has a seasonal high water table at a depth of 1 to 3 feet. In some places the soil contains less clay and more sand. In other places limestone cobbles are above the shale bedrock.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson and moderately well drained Schapville soils. Lawson soils are in the lower areas along drainageways. They formed in alluvium. Schapville soils have calcareous shale bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Massbach soil. Included areas make up less than 10 percent of the unit.

Water and air move through the upper part of the Massbach soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3 to 5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. Erosion can be controlled by a crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, which can result in surface compaction and excessive runoff and erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table, the slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed and the site is leveled.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

753D2—Massbach silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained, deep soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 2 to 45 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 46 inches thick. The upper part is brown and yellowish brown, friable silty clay loam; the next part is brown, mottled, friable silty clay loam; and the lower part is mottled greenish gray, olive yellow, and brownish yellow, firm silty clay. Light yellowish brown, mottled, calcareous, firm silty clay shale bedrock is at a depth of about 53 inches. In some areas the depth to calcareous shale bedrock is more than 60 inches. In other areas the surface soil is lighter colored. In some places, the lower part of the subsoil and the underlying material have limestone cobbles and the depth to calcareous shale bedrock is more than 60 inches. In other places the lower part of the subsoil contains less clay and more sand.

Included with this soil in mapping are small areas the moderately well drained Beavercreek and Schapville and somewhat poorly drained Lawson soils. Beavercreek and Lawson soils are in the lower areas along drainageways. Beavercreek soils formed in alluvium and colluvium. Lawson soils formed in alluvium. Schapville soils have calcareous shale bedrock at a depth of 20 to 40 inches. They are in landscape positions similar to those of the Massbach soil. Included areas make up about 10 percent of the unit.

Water and air move through the upper part of the Massbach soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 3

to 5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to dwellings.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table, the slow permeability, and the slope are limitations if this soil is used as a site for septic tank absorption fields. A septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank or an evapotranspiration bed are installed and the site is leveled.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The shrink-swell potential and the slope also are limitations on sites for dwellings without basements. Land shaping by cutting and filling helps to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. On sites for dwellings with basements, installing subsurface tile drains near the foundations helps to overcome the wetness.

The land capability classification is IIIe.

755F2—Lamoille silt loam, 15 to 30 percent slopes, eroded. This steep, well drained, deep soil is on foot slopes and side slopes along drainageways in the uplands. Individual areas are long and narrow or irregularly shaped and range from 4 to 70 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 35 inches thick. It is yellowish brown and friable. The upper part is silty clay loam, the next part is calcareous cobbly silty clay, and the lower part is calcareous very cobbly silty clay loam. The underlying material to a depth of 60 inches is yellowish brown, calcareous, friable very cobbly silt loam. In some areas the depth to limestone cobbles is more than 60 inches. In other areas the surface soil has more limestone cobbles. In some places, the depth to limestone cobbles is more than 60 inches and the seasonal high water table is at a depth of 4 to 6 feet. In other places, calcareous shale bedrock is at a depth of 40 to 60 inches and the seasonal high water table is at a depth of 2.5 to 6.0 feet.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek and Derinda soils. Beavercreek soils formed in alluvium and colluvium. They are in the lower areas along drainageways. Derinda soils are in the lower landscape positions. They have calcareous shale bedrock at a depth of 20 to 40 inches. Included areas make up less than 15 percent of the unit.

Water and air move through the upper part of the Lamoille soil at a slow rate and through the underlying material at a moderately rapid rate. Surface runoff is rapid in areas of pasture or hay. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or hay. Some are wooded. This soil is poorly suited to pasture and hay. It is moderately suited to woodland and is well suited to woodland wildlife habitat. It is generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Timely deferment of grazing helps to prevent overgrazing, surface compaction, and excessive runoff and erosion. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been

harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIe.

779F—Chelsea loamy fine sand, 20 to 45 percent slopes. This very steep, excessively drained, deep soil is on side slopes in the uplands. Individual areas are broad and irregularly shaped and range from 5 to 125 acres in size.

Typically, the surface layer is very dark grayish brown, very friable loamy fine sand about 5 inches thick. The subsurface layer is about 21 inches thick. It is very friable. The upper part is dark brown loamy fine sand, and the lower part is yellowish brown fine sand. Between depths of 26 and 60 inches are alternating bands of yellowish brown and brown, loose fine sand and brown and reddish brown, very friable loamy sand and sandy loam. In some areas the depth to lamellae is more than 60 inches. In other areas the total thickness of the lamellae is more than 6 inches. In places the subsoil contains more clay.

Included with this soil in mapping are small areas of the moderately well drained Derinda and well drained Lacrescent and Seaton soils. These soils contain more clay and less sand throughout than the Chelsea soil. Derinda soils are on the lower side slopes. They have calcareous shale bedrock at a depth of 20 to 40 inches. Lacrescent soils are on side slopes near the points of ridges. They have limestone colluvium throughout. Seaton soils are in landscape positions similar to those of the Chelsea soil. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Chelsea soil at a rapid rate. Surface runoff is rapid in wooded areas. Available water capacity is low. Organic matter content also is low.

Most areas are wooded. This soil is moderately suited to woodland and is poorly suited to woodland wildlife habitat. It is generally unsuited to cultivated crops, to pasture and hay, and to septic tank absorption fields and dwellings because of the slope.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIs.

785F—Lacrescent silt loam, 15 to 30 percent slopes. This steep, well drained, deep soil is on side slopes along streams and drainageways in the uplands. Individual areas are long and narrow or irregularly shaped and range from 2 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, calcareous, friable silt loam about 10 inches thick. The subsurface layer is dark brown, calcareous, friable very cobbly silt loam about 7 inches thick. The subsoil is yellowish brown, calcareous very cobbly silt loam about 33 inches thick. Yellowish brown dolomitic limestone bedrock is at a depth of about 50 inches. In places, the surface soil is lighter colored and the depth to limestone cobbles is more than 60 inches. In some areas, the surface soil is lighter colored and the lower part of the subsoil contains more clay.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek, well drained Dunbarton and NewGlarus, and somewhat excessively drained Elizabeth soils. Also included are small areas of bedrock outcrops near the top of the side slopes. Beavercreek soils formed in alluvium and colluvium. They are in the lower areas along drainageways. Dunbarton and Elizabeth soils are in the higher landscape positions. They have dolomitic limestone bedrock within a depth of 20 inches. Also, Dunbarton soils have a surface soil that is lighter colored than that of the Lacrescent soil and contain more clay in the subsoil. NewGlarus soils have dolomitic limestone bedrock at a depth of 20 to 40 inches and have a surface soil that is lighter colored than that of the Lacrescent soil. They are in the higher landscape positions. Included areas make up less than 15 percent of the unit.

Water and air move through the Lacrescent soil at a

moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is low. Organic matter content is moderately high. The potential for frost action is moderate.

Most areas are wooded. Some are pastured. This soil is moderately suited to woodland and is well suited to woodland wildlife habitat. It is poorly suited to pasture and hay. It generally is unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope.

Establishing pasture plants on this soil helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Proper stocking rates, rotation grazing, and timely deferment of grazing help to prevent overgrazing and excessive runoff and erosion. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIe.

785G—Lacrescent silty clay loam, 30 to 50 percent slopes. This very steep, well drained, deep soil is on side slopes along streams and drainageways in the uplands. Individual areas are long and narrow or irregularly shaped and range from 2 to 60 acres in size.

Typically, the surface layer is black, calcareous, friable silty clay loam about 5 inches thick. The subsurface layer is about 13 inches of very dark gray and very dark grayish brown, calcareous, friable gravelly silty clay loam and very gravelly silt loam. The subsoil is about 27 inches thick. It is calcareous and friable. The upper part is brown very gravelly silt loam, and the lower part is yellowish brown very cobbly silt loam. The underlying material to a depth of 60 inches is brown, calcareous, friable very gravelly silt loam. In some areas, the surface soil is lighter colored and the depth to limestone cobbles is more than 60 inches. In other areas, the surface soil is lighter colored and the lower part of the subsoil contains more clay.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek, well drained Dunbarton and NewGlarus, and somewhat excessively drained Elizabeth soils. Also included are small areas of bedrock outcrops near the top of the side slopes. Beavercreek soils are in the lower areas along drainageways. They formed in alluvium and colluvium. Dunbarton, Elizabeth, and NewGlarus soils are in the higher landscape positions. Dunbarton and Elizabeth soils have dolomitic limestone bedrock within a depth of 20 inches. Also, Dunbarton soils have a surface soil that is lighter colored than that of the Lacrescent soil and have more clay in the subsoil. NewGlarus soils have dolomitic limestone bedrock at a depth of 20 to 40 inches and have a surface soil that is lighter colored than that of the Lacrescent soil. Included areas make up less than 15 percent of the unit.

Water and air move through the Lacrescent soil at a moderate rate. Surface runoff is very rapid in wooded areas. Available water capacity is low. Organic matter content is moderately high. The potential for frost action is moderate.

Most areas are wooded. This soil is moderately suited woodland and is well suited to woodland wildlife habitat. It is generally unsuited to cultivated crops, to pasture and hay, and to septic tank absorption fields and dwellings because of the slope.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing

additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

800—Psamments, nearly level. These somewhat poorly drained to excessively drained, coarse textured, deep soils are in areas that have been filled and leveled. Individual areas are rectangular or irregularly shaped and range from 3 to 60 acres in size.

Typically, the surface layer is dark grayish brown, mottled loamy sand about 6 inches thick. The underlying material to a depth of 60 inches is brown and very dark grayish brown sand and loamy sand. In some areas the soils are more sloping. In other areas they contain more clay. In places they are subject to flooding.

Included with these soils in mapping are piles of sand and gravel and areas of the well drained Lamont and Seaton soils. Lamont and Seaton soils are in areas that have not been disturbed. Included areas make up about 6 percent of the unit.

Water and air move through the Psamments at a moderately rapid rate because of compaction by heavy equipment. Surface runoff is slow. Available water capacity is low. Organic matter content also is low.

Most of the acreage is idle land. Some areas are used for industrial development. Some areas have no plant cover, whereas some stabilized areas have a good cover of sod. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas. The unit is a probable source of sand.

No land capability classification has been assigned to this unit.

801B—Orthents, silty, undulating. These nearly level to sloping, somewhat poorly drained to well drained, deep soils are in areas that have been sanitary landfills. In some areas the soils were altered by cutting and mixing before fill was added. In other areas the landfill material was placed directly on natural soil. Some areas have been modified by cutting and filling during residential development. Individual areas are irregularly shaped or rectangular and range from 4 to 30 acres in size.

Typically, the surface layer is mixed yellowish brown and dark grayish brown, mottled, calcareous silt loam about 4 inches thick. The underlying material to a depth of 60 inches is a mixture black to olive, calcareous silt loam, organic material, and fragments of nonsoil material. Some areas do not have a layer of soil material above the waste.

Included with these soils in mapping are steep slopes and escarpments along berms, borders, and drainageways and the well drained Seaton and poorly drained Sable soils in areas that have not been disturbed. Included areas make up about 10 percent of the unit.

The rate at which water and air move through the Orthents varies. It is much more rapid in areas where the material has large blocks of refuse than in other areas. Surface runoff generally is slow or medium, but it is ponded in shallow depressions following periods of significant rainfall. Available water capacity is high. Organic matter content is low. Subsidence is a hazard in areas where organic waste decays.

Almost all of the acreage currently is open, idle land. Some areas are used as sites for dwellings or industrial development. Some areas have no plant cover, whereas some stabilized areas have a good cover of sod. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas.

No land capability classification has been assigned to this unit.

864—Pits, quarries. This map unit consists of quarries and the surrounding disturbed areas. Dolomitic limestone bedrock has been removed from the quarries. Individual areas are mainly rectangular and range from 5 to 50 acres in size.

In a typical area, the bottom of the quarries and the vertical sidewalls are limestone bedrock. The excavations are 30 to more than 150 feet deep. The unit supports little or no vegetation. In some areas the quarries contain water. If these areas are more than 3 acres in size, they are identified as water on the soil maps.

Included in this unit in mapping are natural soils and Orthents, silty, around the top of the sidewalls; stockpiles of crushed limestone; areas of machinery; haulage roads; and pools of water less than 3 acres in size. The natural soils and the Orthents support vegetation. The natural soils are in undisturbed areas, and the Orthents are in areas where mine spoil has been mixed with material from around the pits. Included areas make up about 10 percent of the unit.

In most areas the quarries are active, but in some they are abandoned. They are a source of agricultural lime and road rock. They are suited to recreational development. Stocking the water-filled pits with fish and planting trees enhance the recreational areas. Topdressing and grading the disturbed areas help to establish vegetation. Falling rock is a hazard. The feasibility and extent of reclamation should be based on the desired alternative uses and individual site conditions.

No land capability classification has been assigned to this unit.

873D2—Dunbarton-Dubuque silt loams, 7 to 15 percent slopes, eroded. These strongly sloping, well drained soils are on nose slopes and side slopes along drainageways in the uplands. The shallow Dunbarton soil makes up about 50 percent of the unit, and the moderately deep Dubuque soil makes up 40 percent. Individual areas are long and narrow and range from 3 to 60 acres in size.

Typically, the Dunbarton soil has a surface layer of dark brown, friable silt loam about 8 inches thick. The subsoil is about 7 inches thick. It is brown. The upper part is firm silty clay, and the lower part is very firm clay. Yellow and brownish yellow dolomitic limestone bedrock is at a depth of about 15 inches. In places the soil contains less clay and has a darker surface soil. In some areas calcareous shale bedrock is at a depth of 20 to 40 inches.

Typically, the Dubuque soil has a surface layer of dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 20 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is yellowish red, mottled, firm silty clay. Yellow dolomitic limestone bedrock is at a depth of about 27 inches. In some places the upper part of the subsoil contains more sand. In other places the layer of residuum is thicker. In some areas the dolomitic limestone bedrock is at a depth of 40 to 60 inches. In other areas calcareous shale bedrock is at a depth of 40 to 60 inches.

Included with these soils in mapping are small areas of the moderately well drained Beavercreek and Elco soils. Beavercreek soils are in the lower areas along drainageways. They formed in alluvium and colluvium. Elco soils are near the upper end of drainageways. They do not have dolomitic limestone bedrock within a depth of 60 inches. The lower part of their subsoil formed in glacial till. Included areas make up less than 10 percent of the unit.

Water and air move through the Dunbarton soil at a moderately slow rate. They move through the upper part of the Dubuque soil at a moderate rate and through the lower part of the subsoil at a slow rate. Available water capacity is low in both soils. Organic matter content is moderately low. The shrink-swell potential is high. The potential for frost action is moderate in the Dunbarton soil and high in the Dubuque soil.

Most areas are cultivated. These soils are poorly suited to cultivated crops. They are moderately suited to hay and pasture. The Dunbarton soil is generally unsuited to septic tank absorption fields and dwellings because of the depth to bedrock. The Dubuque soil is poorly suited to septic tank absorption fields and to dwellings with basements. It is moderately suited to dwellings without basements.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soils are wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soils and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to bedrock and the restricted permeability are limitations if these soils are used as sites for septic tank absorption fields. The depth to bedrock can be increased by providing suitable fill material. Increasing the size of the absorption field or replacing the soils with material that is more permeable helps to overcome the restricted permeability.

If these soils are used as sites for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The land capability classification is IVe.

873E2—Dunbarton-Dubuque silt loams, 15 to 25 percent slopes, eroded. These steep, well drained soils are on nose slopes and side slopes along drainageways in the uplands. The shallow Dunbarton soil makes up about 50 percent of the unit, and the moderately deep Dubuque soil makes up 40 percent. Individual areas are long and narrow and range from 3 to 60 acres in size.

Typically, the Dunbarton soil has a surface layer of dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 12 inches thick. The upper part is yellowish brown, friable silt loam; the next part is yellowish brown, friable silty clay loam; and the lower part is brown, firm silty clay. Yellow dolomitic limestone bedrock is at a depth of about 19 inches. In some places the soil contains less clay and has a darker

surface soil. In other places the upper part of the subsoil contains more sand. In some areas calcareous shale bedrock is at a depth of 20 to 40 inches.

Typically, the Dubuque soil has a surface layer of dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 23 inches thick. The upper part is mixed dark grayish brown and yellowish brown, friable silt loam; the next part is yellowish brown, friable silty clay loam; and the lower part is strong brown and yellowish brown, mottled, firm silty clay. Brownish yellow dolomitic limestone bedrock is at a depth of about 27 inches. In some places the upper part of the subsoil contains more sand. In other places the layer of residuum is thicker. In some areas the limestone bedrock is at a depth of 40 to 60 inches.

Included with these soils in mapping are small areas of the deep, moderately well drained Beavercreek soils. These included soils are in the lower areas along drainageways. They formed in alluvium and colluvium. They make up about 10 percent of the unit.

Water and air move through the Dunbarton soil at a moderately slow rate. They move through the upper part of the Dubuque soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in pastured areas of both soils. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential is high. The potential for frost action is moderate in the Dunbarton soil and high in the Dubuque soil.

Most areas are used for pasture or hay. Some are wooded. These soils are moderately suited to woodland and to woodland wildlife habitat. They are generally unsuited to cultivated crops and to pasture and hay because of the slope. They are generally unsuited to septic tank absorption fields and dwellings because of the slope of both soils and the depth to bedrock in the Dunbarton soil.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soils are firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIIe.

905F—NewGlarus-Lamoille silt loams, 15 to 35 percent slopes. These steep, well drained soils are on side slopes in the uplands. The moderately deep NewGlarus soil is higher on the landscape than the deep Lamoille soil. The NewGlarus soil makes up about 50 percent of the unit, and the Lamoille soil makes up 45 percent. Individual areas are long and narrow and range from 2 to 200 acres in size.

Typically, the NewGlarus soil has a surface layer of very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is yellowish brown, firm silty clay loam; and the lower part is strong brown, firm gravelly silty clay. Yellow dolomitic limestone bedrock is at a depth of about 34 inches. In some places the layer of residuum is thinner. In other places the surface layer contains more chert fragments.

Typically, the Lamoille soil has a surface layer of dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches. The upper part is yellowish brown, friable silty clay loam; the next part is yellowish brown, firm gravelly and cobbly silty clay; and the lower part is light yellowish brown, calcareous, friable very cobbly silt loam. In some places the surface soil has more limestone cobbles. In other places the depth to limestone cobbles is more than 60 inches. In some areas the soil contains less clay and has a darker surface soil.

Included with these soils in mapping are small areas of the well drained Dunbarton and somewhat excessively drained Elizabeth soils. Also included are small areas of bedrock outcrops near the top of the side slopes. Dunbarton and Elizabeth soils are near nose slopes. They have limestone bedrock within a depth of 20 inches. Also, Elizabeth soils contain less clay than the NewGlarus and Lamoille soils and have a darker surface soil. Included areas make up about 5 percent of the unit.

Water and air move through the upper part of the NewGlarus soil at a moderate rate and through the lower part of the subsoil at a slow rate. They move through the upper part of the Lamoille soil at a slow rate and through the lower part at a moderately rapid rate. Surface runoff is rapid in wooded areas of both soils. Available water capacity is moderate in the NewGlarus

soil and high in the Lamoille soil. Organic matter content is moderately low in both soils. The shrink-swell potential is moderate. The potential for frost action is high in the NewGlarus soil and moderate in the Lamoille soil.

Most areas are wooded. Some are used for pasture or hay. These soils are moderately suited to woodland and are well suited to woodland wildlife habitat. They are poorly suited to pasture and hay. They are generally unsuited to cultivated crops and to septic tank absorption fields and dwellings because of the slope.

Establishing pasture plants or hay on these soils helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help to keep the pasture in good condition. A no-till method of pasture renovation or seeding helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The plants should not be grazed until they are sufficiently established.

In the areas used as woodland, the slope causes a hazard of erosion and limits the use of equipment. Plant competition retards the growth of desirable seedlings. Erosion can be controlled by building logging roads and skid trails on or nearly on the contour, by skidding logs or trees uphill with a cable and winch on the steeper slopes, by providing grass firebreaks, and by seeding bare areas to grasses or to a grass-legume mixture after logging activities have been completed. The use of machinery is limited to periods when the soils are firm. The competition from undesirable plants in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soils, and damage to tree roots. Measures that protect the woodland from fire are needed.

The wooded areas provide habitat for deer, wild turkey, squirrels, and other woodland wildlife. Providing additional food and cover for the wildlife is difficult because of the slope and the hazard of erosion.

The land capability classification is VIe.

928D2—NewGlarus-Palsgrove silt loams, 7 to 15 percent slopes, eroded. These strongly sloping, well drained soils are on ridges in the uplands. The NewGlarus soil is on the narrower ridges. The moderately deep NewGlarus soil makes up about 50 percent of the unit, and the deep Palsgrove soil makes up 40 percent. Individual areas are long and narrow and range from 3 to 160 acres in size.

Typically, the NewGlarus soil has a surface layer of dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 28 inches thick. The upper part is yellowish brown, friable silty clay loam; the next part is yellowish brown, friable cobbly silty clay loam; and the lower part is yellowish red, very firm cobbly clay. Yellow dolomitic limestone bedrock is at a depth of about 36 inches. In places the layer of residuum is thinner. In some areas the surface layer contains more chert fragments.

Typically, the Palsgrove soil has a surface layer of brown, friable silt loam about 7 inches thick. The subsoil is about 46 inches thick. The upper part is yellowish brown, friable silty clay loam, and the lower part is yellowish red, firm gravelly clay and cobbly silty clay. Yellow dolomitic limestone bedrock is at a depth of about 53 inches. In some areas the depth to dolomitic limestone bedrock is more than 60 inches.

Included with these soils in mapping are small areas of the well drained Dunbarton and somewhat excessively drained Elizabeth soils. These included soils are on pointed ridges. They have limestone bedrock within a depth of 20 inches. Elizabeth soils contain less clay than the NewGlarus and Palsgrove soils and have a darker surface soil. Included areas make up less than 10 percent of the unit.

Water and air move through the upper part of the NewGlarus and Palsgrove soils at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. These soils are moderately suited to cultivated crops. They are well suited to hay and pasture. They are poorly suited to septic tank absorption fields and are moderately suited to dwellings without basements. The Palsgrove soil is moderately suited to dwellings with basements, and the NewGlarus soil is poorly suited.

Unless the surface is protected, further erosion is a hazard in areas used for corn, soybeans, or small grain. It can be controlled by a cropping system that is dominated by forage crops. Tilling when the soils are wet causes surface cloddiness and compaction and excessive runoff and erosion. Returning crop residue to the soils and regularly adding other organic material increase the rate of water infiltration and improve tilth.

A cover of grasses and legumes improves tilth and helps to control erosion. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. A no-till method of seeding or pasture renovation helps to establish forage species and control erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The depth to limestone bedrock and the restricted permeability are limitations if these soils are used as sites for septic tank absorption fields. An unconventional septic system, such as a shallow system that includes no gravel, a system that includes a modified buried sand filter, or a mechanical aeration system, functions satisfactorily in areas of the NewGlarus soil. In areas of the Palsgrove soil, conventional septic systems function satisfactorily only if they are installed at a sufficient distance above the bedrock. Enlarging the absorption field helps to overcome the restricted permeability. Installing the laterals in the absorption field on the contour helps to overcome the slope.

The slope and the shrink-well potential are limitations if these soils are used as sites for dwellings. The depth to bedrock in the NewGlarus soil also is a limitation. The depth to bedrock in the Palsgrove soil is a limitation on sites for dwellings with basements. Backfilling the foundation trench with suitable coarse textured material and reinforcing the foundations help to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope. The bedrock can be excavated with some difficulty in areas of the NewGlarus soil. Basements should be built above the bedrock in areas of the Palsgrove soil.

The land capability classification is IIIe.

1334—Birds silt loam, wet. This nearly level, poorly drained, deep soil is on broad flood plains. It is subject to ponding and is frequently flooded for long periods from February through June. Individual areas are long and narrow or irregularly shaped and range from 40 to 400 acres in size.

Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches is dark grayish brown and dark gray, mottled, friable silt loam. In places the surface layer and the upper part of the underlying material contain more clay. In some areas the soil is flooded throughout most of the year.

Included with this soil in mapping are small areas of the somewhat poorly drained Algansee and Wakeland soils. These soils are in the higher landscape positions. Algansee soils contain more sand throughout than the Birds soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Birds soil at a moderately slow rate. Surface runoff is slow to ponded in wooded areas. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are wooded. This soil is moderately suited to woodland and is well suited to wetland wildlife habitat. It is generally unsuited to septic tank absorption fields and dwellings because of the ponding and the hazard of flooding.

If this soil is used as woodland, an equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the wetness. Plant competition also is a management concern. It retards the growth of desirable seedlings. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than is typical, or by mulching. Some replanting may be needed. Removing only high-value trees from a strip 50 feet wide along the west and south edges of the woodland and using harvesting methods that do not isolate trees or leave them widely spaced reduce the hazard of windthrow. Plant competition can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The grain and seed crops, grasses and legumes, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that protect the habitat from fire and grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is Vw.

3077—Huntsville silt loam, frequently flooded. This nearly level, well drained, deep soil is on flood plains. It is frequently flooded for very brief periods from March through May. Individual areas are long and irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 7 inches thick. The subsurface layer is friable silt loam about 30 inches thick. The upper part is black and very dark brown, and the lower part is dark brown. The underlying material to a depth of 60 inches is dark brown, friable silt loam. In some places the dark surface soil is thinner. In other places, the soil has free carbonates throughout and the surface soil is lighter colored. In some areas the underlying material contains more sand. In other areas the soil is subject to rare flooding.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson soils. These soils

are in the lower landscape positions. Some of the lower areas of these soils are undrained. Included areas make up less than 10 percent of the unit.

Water and air move through the Huntsville soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is very high. Organic matter content is moderately high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

In areas used for corn, soybeans, or small grain, the flooding is a hazard, but it occurs during the growing season less often than once in 2 years. Erosion or scouring by floodwater is a hazard if the soil is cultivated. Avoiding fall cultivation and establishing strips of grass in critical areas reduce this hazard. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

In areas used for hay or pasture, the flooding is a hazard. Timely seeding and pasture renovation, seeding of adapted forage species, deferred grazing when the soil is too wet, proper stocking rates, and rotation grazing minimize compaction and improve forage production. The flooding delays the harvesting of hay in some years.

The land capability classification is IIw.

3333—Wakeland silt loam, frequently flooded. This nearly level, somewhat poorly drained, deep soil is on flood plains. It frequently flooded for long periods from February through May. Individual areas are long and irregularly shaped and range from 5 to 120 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The underlying material is mottled silt loam about 41 inches thick. The upper part is dark grayish brown and friable, the next part is dark grayish brown and very friable, and the lower part is dark gray and friable. Below this to a depth of 60 inches is a buried soil of black, friable silt loam. In some areas the soil is well drained. In other areas it contains more clay throughout. In some places the underlying material contains more sand. In other places the buried soil is within a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Birds and moderately well drained Dorchester and Beavercreek soils. Birds soils are in the lower landscape positions. They have more clay throughout than the Wakeland soil. Dorchester soils are calcareous throughout. They are in the slightly higher areas and are occasionally flooded. Beavercreek soils are in the lower landscape positions. They formed in alluvium and colluvium. Included areas make up less than 10 percent of the unit.

Water and air move through the Wakeland soil at a moderate rate. Surface runoff is very slow in wooded areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are wooded. Some are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture, to woodland, and to woodland wildlife habitat. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

In the areas used as woodland, the seasonal high water table limits the use of equipment and plant competition is a management concern. The use of equipment is limited to periods when the soil is firm and dry. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

In areas used for corn, soybeans, or small grain, the flooding is a hazard and the wetness is a limitation. The wetness caused by flooding or the seasonal high water table delays planting and harvesting in some years. Also, flooding during the growing season damages crops in some years. A drainage system may be needed. Subsurface drains and surface ditches help to remove excess water. Returning crop residue to the soil helps to prevent surface crusting and deterioration of tilth.

If this soil is used for forage or hay, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control flooding, and subsurface tile drains help to lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays the harvesting of hay in some years. Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suitable.

The grain and seed crops, grasses and legumes, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that

protect the habitat from fire and grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIIw.

3451—Lawson silt loam, frequently flooded. This nearly level, somewhat poorly drained, deep soil is on flood plains along the major streams and drainageways. It is frequently flooded for brief periods from March through May. Individual areas are irregularly shaped or long and narrow and range from 3 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is very dark brown, friable silt loam about 21 inches thick. It is mottled in the lower part. The underlying material extends to a depth of 60 inches. It is friable. The upper part is very dark grayish brown silt loam, and the lower part is dark grayish brown, mottled silt loam and silty clay loam. In some areas a buried soil is at a depth of 20 to 40 inches. In other areas, the surface soil is lighter colored and a buried soil is at a depth of 20 to 40 inches. In some places cobbles are at a depth of 40 to 60 inches. In other places the seasonal high water table is below a depth of 6 feet.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and moderately well drained Beavercreek soils. These soils are in the lower landscape positions. Beaucoup soils contain more clay in the subsoil than the Lawson soil and have a thinner dark surface soil. In some areas they are undrained. They are occasionally flooded. Beavercreek soils formed in alluvium and colluvium. Included areas make up less than 15 percent of the unit.

Water and air move through the Lawson soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

Corn and soybeans can be grown in most areas of this soil because a drainage system has been installed. The flooding is a hazard, but it occurs during the growing season less often than once in 2 years. Measures that maintain the drainage system are needed. Additional drainage measures are needed in some areas. The wetness can be reduced by surface ditches or subsurface drains. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

If this soil is used for forage or hay, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control flooding, and subsurface tile drains help to lower the water table. The flooding delays the harvesting of hay in some years. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suitable. The suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

The land capability classification is IIIw.

3579—Beavercreek silt loam, frequently flooded. This nearly level, moderately well drained, deep soil is on flood plains. It is frequently flooded for very brief periods from March through June. Individual areas are long and narrow or irregularly shaped and range from 3 to 120 acres in size.

Typically, the surface layer is very dark grayish brown, calcareous, friable silt loam about 4 inches thick. The underlying material is about 48 inches thick. It is calcareous and friable. The upper part is very dark grayish brown silt loam and brown gravelly silt loam, the next part is dark grayish brown extremely gravelly loam, and the lower part is dark grayish brown very gravelly loam that has sandy depositional strata. Below this to a depth of 60 inches is a mottled, friable, calcareous buried soil. The upper part of the buried soil is very dark gray gravelly silt loam, and the lower part is dark grayish brown very gravelly loam. In some places the surface soil is darker and thicker. In other places the depth to cobbles is more than 20 inches. In some areas the soil contains more clay. In a few areas depth to the buried soil is less than 40 inches. In other areas bedrock is within a depth of 60 inches.

Included with this soil in mapping are small areas of the moderately well drained Dorchester, well drained Huntsville, and somewhat poorly drained Lawson soils. These soils are in the slightly higher areas away from stream channels. They formed in alluvium. Huntsville and Lawson soils do not have free carbonates within a depth of 60 inches and have a dark surface soil. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Beavercreek soil at a moderately rapid rate. Surface runoff is slow in pastured areas. The seasonal high water table is 4 to 6

feet below the surface during the spring. Available water capacity is low. Organic matter content is moderately low.

Most areas are used as pasture. Some are wooded. This soil is moderately suited to pasture, hay, and woodland. It is well suited to woodland wildlife habitat. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

If this soil is used as woodland, an equipment limitation is a management concern. Machinery should be used only when the soil is firm enough to support the equipment. Plant competition retards the growth of desirable seedlings. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The grain and seed crops, grasses and legumes, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that protect the habitat from fire and grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is VIs.

7430B—Raddle silt loam, 1 to 4 percent slopes, rarely flooded. This gently sloping, moderately well drained, deep soil is on stream terraces. It is subject to rare flooding for brief periods from March through May. Individual areas are broad and irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsoil is friable silt loam about 42 inches thick. The upper part is yellowish brown, the next part is yellowish brown and mottled, and the lower part is brown and mottled. The underlying material to a depth of 60 inches is grayish brown, mottled, friable silt loam. In some areas the surface soil is thicker. In other areas it is lighter colored. In some places the depth to a seasonal high water table is less than 4 feet. In other places the subsoil and the underlying material contain more clay. In some areas cobbles are below a depth of 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek and poorly drained Beaucoup soils. These soils are in the lower areas. Beavercreek soils formed in alluvium and colluvium. They are frequently flooded. Beaucoup soils are occasionally flooded. They contain more clay in the subsoil than the Raddle soil. Included areas make up about 10 percent of the unit.

Water and air move through the Raddle soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately high. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard, particularly near drainageways. Also, the seasonal high water table is a limitation. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

The land capability classification is IIe.

8070—Beaucoup silty clay loam, occasionally flooded. This nearly level, poorly drained, deep soil is on flood plains along small streams. It is subject to ponding and is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 2 to 140 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil is about 26 inches thick. It is mottled and friable. The upper part is dark gray and gray silty clay loam, and the lower part is light brownish gray silty clay loam and silt loam. The underlying material to a depth of 60 inches is light gray and light brownish gray, mottled, friable, stratified silty clay loam and silt loam. In some places the surface soil is thicker. In other places the soil has overwash of silt loam, which is less than 20 inches thick. In some areas the soil has cobbles below a depth of 40 inches. Other areas are undrained.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson and Tice soils.

Lawson soils are frequently flooded. They contain less clay than the Beaucoup soil and have a thicker surface soil. Tice soils are in the slightly higher landscape positions. Included areas make up less than 10 percent of the unit.

Water and air move through the Beaucoup soil at a moderately slow rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface during the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the flooding and the ponding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the seasonal high water table is a limitation. The flooding occurs during the growing season less often than once in 2 years. Corn, soybeans, and small grain can be grown because a drainage system has been installed. Measures that maintain the drainage system are needed. Additional drainage measures are needed in some areas. Subsurface tile drains function satisfactorily if suitable outlets are available. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. A conservation tillage system that leaves crop residue on the surface after planting improves tilth, helps to prevent surface compaction and crusting, and increases the rate of water infiltration.

If this soil is used for forage or hay, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control flooding, and subsurface tile drains help to lower the water table. The flooding delays the harvesting of hay in some years. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suitable. The suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

The land capability classification is IIw.

8239—Dorchester silt loam, occasionally flooded. This nearly level, moderately well drained, deep soil is on flood plains. It is occasionally flooded for very brief periods from March through May. Individual areas are long and irregularly shaped and range from 3 to 60 acres in size.

Typically, the surface layer is dark grayish brown, calcareous, friable silt loam about 8 inches thick. The underlying material is dark grayish brown, calcareous, mottled, friable silt loam about 14 inches thick. Below this to a depth of 60 inches is a buried soil of calcareous, friable silt loam. The upper part of the buried soil is black, and the lower part is very dark grayish brown. In some places the soil contains less clay throughout. In other places it does not have a buried soil within a depth of 45 inches. In some areas cobbles are below a depth of 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Beavercreek, well drained Huntsville, and somewhat poorly drained Orion and Wakeland soils. Beavercreek soils formed in alluvium and colluvium. Huntsville soils have a surface layer that is darker than that of the Dorchester soil and do not have free carbonates. They are frequently flooded. Orion and Wakeland soils are in the lower areas and are frequently flooded. They do not have free carbonates throughout. Wakeland soils do not have a buried soil within a depth of 40 inches. Some of the lower areas of these soils are undrained. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Dorchester soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The surface layer is mildly alkaline, and the underlying material is moderately alkaline. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

In the areas used for corn, soybeans, or small grain, the flooding is a hazard, but it occurs during the growing season less often than once in 2 years. Erosion or scouring by floodwater is a hazard if the soil is cultivated. Avoiding fall cultivation and establishing strips of grass in critical areas reduce this hazard. Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

If this soil is used as pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. The flooding delays the harvesting of hay in some years.

The land capability classification is IIw.

8284—Tice silt loam, occasionally flooded. This nearly level, somewhat poorly drained, deep soil is on flood plains. It is occasionally flooded for very brief periods from March through May. Individual areas are irregularly shaped or long and narrow and range from 3 to 80 acres in size.

Typically, the surface soil is very dark grayish brown, friable silt loam about 19 inches thick. The subsoil is about 25 inches thick. It is brown, mottled, and friable. The upper part is silt loam, and the lower part is silty clay loam. The underlying material to a depth of 60 inches is mottled brown, light brownish gray, and reddish yellow, friable silt loam. In some areas the dark surface soil is thinner. In other areas the soil has a thin layer of overwash, which is silt loam. In some places cobbles are below a depth of 40 inches. In other places the subsoil contains less clay. In some areas the soil is subject to rare flooding.

Included with this soil in mapping are small areas of the poorly drained Beaucoup, moderately well drained Beavercreek, and somewhat poorly drained Lawson soils in the lower landscape positions. Beaucoup soils are undrained in some areas. Beavercreek and Lawson soils are frequently flooded. Beavercreek soils formed in alluvium and colluvium. They have a surface soil that is lighter colored than that of the Tice soil. Lawson soils contain less clay throughout than the Tice soil and have a thicker surface soil. Included areas make up less than 10 percent of the unit.

Water and air move through the Tice soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, and alfalfa are suitable. The suitable warm-season grasses include indiangrass, switchgrass, and little bluestem. The flooding delays the harvesting of hay in some years.

The land capability classification is IIw.

8366—Algansee fine sandy loam, occasionally flooded. This nearly level, somewhat poorly drained, deep soil is on flood plains. It is occasionally flooded for long periods from February through May. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark gray, friable fine sandy loam about 3 inches thick. The subsoil is about 26 inches thick. The upper part is mottled dark grayish brown and yellowish brown, very friable loamy fine sand; the next part is dark brown, very friable loamy fine sand; and the lower part is yellowish brown, loose fine sand. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, loose fine sand. In some areas the surface layer contains more clay. In other areas the soil is subject to rare flooding.

Included with this soil in mapping are small areas of the poorly drained Birds and somewhat poorly drained Wakeland soils. These soils are in the lower areas and are frequently flooded. They contain more clay throughout than the Algansee soil. They make up 5 to 10 percent of the unit.

Water and air move through the Algansee soil at a rapid rate. Surface runoff is slow in wooded areas. The seasonal high water table is 1 to 2 feet below the surface during the spring. Available water capacity is low. Organic matter content is moderately low. The potential for frost action is moderate.

Most areas are wooded. This soil is moderately suited to woodland and to habitat for wetland and woodland wildlife. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

In the areas used as woodland, the use of equipment is limited to periods when the soil is firm and dry. The competition from undesirable vegetation in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The grain and seed crops, grasses and legumes, and wild herbaceous plants that provide food and cover for openland wildlife grow well on this soil. Measures that protect the habitat from fire and grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which

enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIIw.

8415—Orion silt loam, occasionally flooded. This nearly level, somewhat poorly drained, deep soil is on flood plains. It is occasionally flooded for very brief periods from March through May. Individual areas are long and narrow or irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The underlying material is dark brown and dark grayish brown, mottled, friable silt loam about 18 inches thick. Below this to a depth of 60 inches is a buried soil. The upper part of the buried soil is black silt loam and silty clay loam, the next part is very dark gray silty clay loam, and the lower part is dark grayish brown, mottled, friable silt loam. In some areas the soil has free carbonates throughout. In some places depth to the buried soil is more than 40 inches. In other places limestone cobbles are below a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and moderately well drained Beavercreek soils. Beaucoup soils are in the lower landscape positions. They are undrained in some areas. They have a surface soil that is darker than that of the Orion soil and contain more clay in the surface soil and in the upper part of the subsoil. Beavercreek soils formed in alluvium and colluvium. They are in the lower areas and are frequently flooded. Included areas make up less than 15 percent of the unit.

Water and air move through the Orion soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is generally unsuited to septic tank absorption fields and dwellings because of the hazard of flooding.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table delays planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used for forage or hay, the flooding is a hazard and the seasonal high water table is a limitation. Dikes and diversions help to control flooding, and subsurface tile drains help to lower the water table. The flooding delays the harvesting of hay in some years. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. Bromegrass, orchardgrass, tall fescue, alfalfa, and alsike clover are suitable. The suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.

The land capability classification is IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 84,000 acres in Jo Daviess County, or more than 21 percent of the total acreage, meets the requirements for prime farmland. Associations 1 and 2, which are described under the heading "General Soil Map Units," have the highest percentage of prime farmland, but this land is in scattered areas throughout the county. It generally is used for crops, mainly corn, soybeans, oats, and hay. The crops grown on this land account for most of the local farm income.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures. An adequate drainage system has been installed in most of the naturally wet soils in Jo Daviess County.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Lester Johnson, resource conservationist, Illinois Division of Energy and Natural Resources, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1987, about 214,000 in Jo Daviess County was cropland. Approximately 83,400 acres was used for corn, 52,000 acres for hay, 53,800 acres for oats, and 8,000 acres for soybeans. Minor crops included winter wheat, rye, barley, and vegetables *(5)*. About 100,000 acres of farmland was not used for annual crops. This acreage was evenly divided between pasture and woodland. Most of the woodland was grazed.

During the past 35 years, the acreage used for hay and that used for soybeans have slightly increased and the acreage used for corn has almost doubled. The increase in the acreage used for corn has been at the expense of oats, permanent pasture, and rotation pasture. The intensive cultivation that is typical in areas used for corn has increased the hazard of water erosion.

Erosion is a hazard on more than 90 percent of the cropland in the county. Erosion is damaging for three reasons. First, the top 4 to 6 inches, which supplies most of the plant nutrients and water in the soil, is lost. Second, tillage in eroded areas incorporates soil material with poor tilth into the plow layer. Third, erosion results in the sedimentation of drainageways, ponds, streams, and lakes, increasing the cost of dredging, of treating water, and of maintaining terraces and drainageways.

Crop rotations that include hay, minimum tillage, contour farming, and grassed waterways commonly help to control erosion in the county. Contour stripcropping is effective in controlling erosion even in steep areas. It is used on many hillsides in the county.

Terraces are most effective where the soil is deep and is gently sloping or sloping. Deep prairie soils, such as Tama, Downs, and Muscatine soils, generally are well suited to terracing. They are most common in the northeastern part of the county. In some areas of the deep Fayette soils, which formed in loess, a single terrace can be established near the top of the hill and other erosion-control measures can be applied on the steep, more irregular slopes below.

Water drains from many fields into steep areas of pasture or woodland. Gully erosion is common in these areas. Soils that formed in thick deposits of loess, such as Seaton silt loam, are near the Mississippi River. Gullies 10 to 20 feet deep form in some areas at the head of steep drainageways, especially within a few miles of the Mississippi River. In other parts of the county, the gullies are commonly 2 to 10 feet deep. They extend several hundred feet in some areas where gullying has been accelerated by erosive farming practices. As gullies form, boxelder trees generally become established. They provide little protection against gully erosion. Gullied areas commonly are improved by filling, land shaping, and grass sod. Grade stabilization structures, such as dry dams and metal toe walls, may be needed. Grassed waterways help to slow or stop the advance of gullies into fields.

Hay and pasture plants provide a protective cover. They grow well on the droughty, moderately deep soils that are common in the steeper areas of the county. Dubuque, Derinda, and Schapville soils, which are moderately deep over limestone or shale bedrock, have a limited available water capacity. Deep-rooted perennial legumes and grasses make the most efficient use of the limited amount of available water. Alfalfa or alfalfa-grass mixtures are the most productive forage crops in the county and are grown in many areas. Red clover and birdsfoot trefoil may be suitable in areas where temporary wetness is a problem, such as some areas of soils that formed in shale residuum.

Although the soils are poorly drained or somewhat poorly drained on only a small acreage in the county, many fields have been improved by tile drainage, especially in areas of soils that are underlain by shale bedrock, such as Derinda and Eleroy soils. These soils are commonly adjacent to the deep Rozetta soils, which formed entirely in loess. Drainage of low spots and grassed waterways may be needed to improve the suitability for farming. Surface tile inlets are used in areas of seeps and springs. Field drainage tile can improve the suitability of somewhat poorly drained soils, such as Atterberry, Muscatine, and Orion soils, for farming.

The soils that formed in loess have a high capacity to supply natural potassium and phosphate. These nutrients are slowly released, however, and can be quickly depleted by intensive cropping. Soil tests are needed to evaluate soil fertility and plan proper rates of limestone and fertilizer application. Pastures with an adequate level of fertility can be seeded to the more productive legumes, such as alfalfa and birdsfoot trefoil. Good pasture management includes rotation grazing and restricted grazing in fall and spring.

Some sandy soils, such as Sparta and Dickinson soils, are near the Mississippi River. These soils have a lower capacity to supply nutrients than other soils in the county. Special management is needed to maintain or improve fertility.

Some soils on narrow bottom land, such as Dorchester and Beavercreek soils, have a pH of more than 7.0. Special management is needed to maintain the availability of phosphate in these soils.

A small acreage of very clayey soils is near the lower reaches of Rush Creek, the Apple River, and other major tributaries. These soils are better suited to pasture and woodland than to cropland. Special management is needed if they are used as cropland.

Detailed information about soil testing, fertility, crop production, and pasture management is available from the Cooperative Extension Service and the Natural Resources Conservation Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(3)*. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are

likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(7)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in the table 6.

Woodland Management and Productivity

Ralph Eads, district forester, Illinois Department of Conservation, helped prepare this section.

In 1987, only 60,000 acres in Jo Daviess County, or about 15 percent of the total acreage, was covered by timber *(5)*. Most of the areas that can be cultivated have been cleared. Trees grow mainly on the rocky, steep slopes. The steep forested soils generally support white oak, red oak, black oak, shagbark hickory, bitternut hickory, basswood, sugar maple, American elm, slippery elm, and black cherry. These soils are in associations 3 and 5, which are described under the heading "General Soil Map Units." The soils generally are suited to trees. The slope and the hazard of erosion are the main concerns in managing the woodland in these associations.

A small acreage in the county consists of nearly level soils along the Mississippi River. These soils are in association 6. The most common tree species on these soils are cottonwood, silver maple, black walnut, green ash, and elm. Wetness is the main concern in managing the woodland in this association.

Some unique species of trees and shrubs are evident in Jo Daviess because of inaccessibility for logging and for destructive grazing by livestock. These are white pine, paper birch, chinkapin oak, and Canada yew. Large old native white pine grows in several areas throughout the county. Natural reproduction of this species occurs in areas where livestock grazing is not allowed.

In 1986, the county had only one active custom

sawmill. It formerly had at least another 10 active sawmills. The largest market for sawlogs from the county is Dubuque, Iowa. Timber buyers from Illinois, Iowa, Wisconsin, and Missouri also acquire logs from the county.

Less than 10 percent of the woodland in the county is properly managed. The two main deterrents to proper management are livestock grazing and improper harvesting techniques. Livestock grazing is very harmful and slowly kills a stand. Woodland can recover from improper harvesting over a period of years if grazing by livestock is not allowed, the woodland is not bulldozed, and a 40- to 60-year cutting rotation is used rather than a 10- to 15-year rotation. A properly managed, well stocked stand can produce more than 300 board feet per acre per year.

Proper harvesting methods, exclusion of livestock, and timber stand improvement are the main management needs on the woodland in the county. In wooded areas where a commercial timber harvest is not possible, timber stand improvement is needed. It involves removing deformed trees and undesirable species and thinning areas where the stand density is too high for the best tree growth.

Tree planting is needed on about 30,000 acres of inadequately stocked woodland in the county *(4)*. The trees that are selected for planting on this land should be those that can be used for wood products and can reduce the hazard of erosion.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main

restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class.* The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class,* a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Lester Johnson, resource conservationist, Illinois Division of Energy and Natural Resources, helped prepare this section.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Jo Daviess County has many areas of historic and scenic interest. The historical sites include Grant's Home, Old Market House, and numerous preserved historical homes. The scenic areas provide opportunities for hiking, fishing, picnicking, camping, skiing, hunting, boating, horseback riding, and golf. Public recreational areas include Apple River Canyon State Park, the Tapley Woods Conservation Area, the Blanding Landing Public Use Area, and land along the Mississippi River under the control of the U.S. Department of the Interior. Two private areas have large lakes that provide recreational opportunities for their patrons.

The demand for recreational facilities has increased greatly in the past several years. The potential for additional development of recreational facilities is good in associations 3 and 5, which are described under the heading "General Soil Map Units." These associations are characterized by sloping ridges and steep, wooded side slopes. This topography provides a variety of opportunities for recreational uses, such as paths, trails, camping areas, and picnic areas. The major limitation in these recreational areas is the slope.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Scott Schaeffer, biologist, Illinois Department of Conservation, helped prepare this section.

Jo Daviess County has a wide variety of wildlife. Many recreational opportunities in the county are associated with the wildlife resources.

In order to maintain the population of wildlife in the county, adequate habitat must be preserved and developed. Deer, rabbits, squirrels, raccoon, quail, Hungarian partridge, mourning doves, and pheasants all require a place to raise their offspring, find food, and escape from predators and harsh weather. The variety of wildlife species on a given tract of land depends on the number and variety of plants in the area. Therefore, measures that maintain or achieve plant diversity are needed. Pheasants, rabbits, quail, and Hungarian partridge, for example, require early successional growth—grassy herbaceous areas interspersed throughout crop fields, fence rows, hedgerows, and idle land. Deer, squirrel, raccoons, and wild turkeys inhabit mixed, uneven-aged timber stands with plenty of edge around crop fields.

Wild turkey has been successfully reintroduced into the county and each year continues to expand its range and increase in population. Sportsmen in the county enjoy some of the finest deer hunting in the State.

Farmers in the county can provide wildlife habitat and meet their soil and water conservation objectives by planting a wide variety of crops and managing their diverted acres for wildlife. Planting winter food and cover plots consisting of corn, sorghum, or sudangrass can improve the habitat in set-aside areas. Also, legumes planted in these areas provide excellent nesting cover for a variety of wildlife. Filter strips made up of grass-legume mixtures seeded along field borders and next to tributaries not only filter out silt and other pollutants but also provide a ribbon of wildlife habitat.

Planting small shrubs along the perimeter of woodlots and creating 1- to 5-acre openings through timber cutting enhance the edge effect in wooded areas. If seeded to clover mixtures or annuals, such as oats and rye, the openings attract deer and turkeys. Removing the less desirable species, such as boxelder, elm, and silver maple, and thus allowing species of oak, hickory, and walnut to have adequate growing space can improve the habitat in wooded areas. The branches from the removed trees can be used to make brush piles, which are especially important to rabbits and other prey species. Measures that protect woodlots and

grassy and brushy areas from fire and grazing help to maintain plant diversity.

The county is very important to migratory waterfowl. Thousands of ducks, geese, and shore birds find food and refuge along the Mississippi River and its backwaters and tributaries. Landowners can improve their wetlands by establishing grassy nesting areas in the adjacent uplands at a rate of 4 acres of grass per 1 acre of wetland. This measure helps to keep sediments and chemical runoff from destroying the wetland plant communities needed by migratory waterfowl. Nesting platforms used extensively by Canada geese and nesting boxes used by wood ducks are beneficial.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and oats.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and wheatgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, Hungarian partridge, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The

ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet.

Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high

content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a

percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The

classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of rock fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly

impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information about flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Bureau of Materials, Illinois Department of Transportation, Springfield, Illinois.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(8)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(9)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(8)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Algansee Series

The Algansee series consists of deep, somewhat poorly drained, rapidly permeable soils on flood plains. These soils formed in sandy alluvium. Slopes range from 0 to 2 percent.

The Algansee soils in this survey area have a developed subsoil, which is not definitive for the series. This difference, however, does not significantly affect the use and management of the soils.

Typical pedon of Algansee fine sandy loam, 2,600 feet south and 600 feet east of the northwest corner of sec. 29, T. 29 N., R. 2 W.

A—0 to 3 inches; very dark gray (10YR 3/1) fine sandy loam, gray (10YR 5/1) dry; weak medium and fine granular structure; friable; many very fine roots; neutral; abrupt smooth boundary.

BA—3 to 10 inches; mottled dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw—10 to 16 inches; dark brown (10YR 4/3) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

BC—16 to 29 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; neutral; gradual smooth boundary.

C1—29 to 50 inches; dark yellowish brown (10YR 4/4) fine sand; common medium faint grayish brown (10YR 5/2) mottles; single grain; loose; neutral; gradual smooth boundary.

C2—50 to 60 inches; dark yellowish brown (10YR 4/4) sand; common medium prominent yellowish brown (10YR 5/6) mottles; single grain; loose; neutral.

The thickness of the solum ranges from 7 to 30 inches. The A horizon has value of 3 or 4 and chroma of 1 or 2. The Bw horizon has value of 4 or 5 and chroma of 2 to 4. It is loamy fine sand or fine sand. The C horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 3 or 4.

Appleriver Series

The Appleriver series consists of deep, somewhat poorly drained soils on ridges in the uplands. These soils formed in loess and in the underlying material weathered from calcareous shale. Permeability is moderate in the upper part of the solum and very slow in the lower part. Slopes range from 2 to 5 percent.

Typical pedon of Appleriver silt loam, 2 to 5 percent slopes, 1,140 feet east and 2,460 north of the southwest corner of sec. 27, T. 29 N., R. 4 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; friable; many fine roots; fragments of pale brown (10YR 6/3) E material in the lower part; neutral; abrupt smooth boundary.

E—10 to 14 inches; pale brown (10YR 6/3) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; many fine roots; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; medium acid; clear smooth boundary.

BE—14 to 19 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium platy structure parting to moderate fine subangular blocky; friable; many fine roots; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—19 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to strong fine subangular and angular blocky; friable; common fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; many distinct pale brown (10YR 6/3) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt2—26 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt3—34 to 44 inches; light olive brown (2.5Y 5/4) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few very fine roots; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; common medium and fine accumulations of iron and manganese oxide; about 2 percent chert fragments of gravel size; a band of reddish brown (5YR 4/4) material between depths of 38 and 40 inches; medium acid; clear smooth boundary.

2Bt4—44 to 50 inches; light yellowish brown (2.5Y 6/4) silty clay; few medium distinct greenish gray (5G 6/1) mottles; weak coarse prismatic structure; firm; few very fine roots; common distinct brownish yellow (10YR 6/6) clay films on faces of peds; common fine accumulations of iron and manganese oxide; slightly effervescent; mildly alkaline; abrupt smooth boundary.

2Cr—58 to 60 inches; mottled light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/6), and greenish gray (5BG 6/1) silty clay shale bedrock; massive; very

firm; many fine concretions of lime; strongly effervescent; moderately alkaline.

The depth to bedrock ranges from 45 to 60 inches. The thickness of the loess ranges from 30 to 50 inches.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has value of 4 to 6 and chroma of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silty clay loam or silt loam. The 2Bt horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4. It is silty clay or silty clay loam. The 2Cr has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 2 to 6.

Atterberry Series

The Atterberry series consists of deep, somewhat poorly drained, moderately permeable soils on broad upland ridges and on stream terraces. These soils formed in loess. Slopes range from 1 to 3 percent.

Typical pedon of Atterberry silt loam, 1 to 3 percent slopes, 2,107 feet west and 800 feet north of the southeast corner of sec. 9, T. 27 N., R. 4 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many fine roots; distinct pale brown (10YR 6/3) silt coatings on faces of peds; medium acid; abrupt smooth boundary.

E—9 to 13 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; few fine distinct yellowish brown (10YR 5/6) mottles; weak thin platy structure; friable; many fine roots; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; few very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

BE—13 to 18 inches; brown (10YR 5/3) silt loam; light brownish gray (10YR 6/2) exterior of peds; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; many fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Btg1—18 to 26 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) and few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium and fine subangular blocky structure; friable; many fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; few fine accumulations of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg2—26 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8), common fine prominent strong brown (7.5YR 4/6), and few fine faint light gray (2.5Y 7/2) mottles; weak medium prismatic structure parting to moderate medium angular and subangular blocky; friable; common fine roots; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few very dark grayish brown (10YR 3/2) organic coatings along root channels; few accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

Btg3—32 to 48 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; few fine roots; few distinct dark brown (10YR 4/3) clay films along root channels; few accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

BCg—48 to 60 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) silty clay loam; massive; friable; few fine roots; few dark brown (10YR 4/3) coatings on earthworm castings; few fine accumulations of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 42 to 60 inches. Some pedons in cultivated areas do not have an E horizon. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The BC horizon is silty clay loam or silt loam.

Beaucoup Series

The Beaucoup series consists of deep, poorly drained, moderately slowly permeable soils on flood plains along small streams. These soils formed in silty slack-water alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Beaucoup silty clay loam, occasionally flooded, 1,100 feet west and 40 feet north of the southeast corner of sec. 7, T. 27 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate fine and medium granular; friable; few very fine roots; neutral; abrupt smooth boundary.

A—9 to 16 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium

subangular blocky structure parting to moderate fine and medium granular; friable; few very fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg1—16 to 20 inches; dark gray (10YR 4/1) silty clay loam; few fine prominent brown (7.5YR 4/4) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—20 to 27 inches; gray (10YR 5/1) silty clay loam; few fine prominent brown (7.5YR 4/4) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg3—27 to 36 inches; light brownish gray (2.5Y 6/2), stratified silty clay loam and silt loam; common fine prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; common distinct dark gray (10YR 4/1) and very dark gray (10YR 3/1) organic coatings on faces of peds; few fine soft accumulations of iron and manganese oxide; neutral; clear smooth boundary.

BCg—36 to 42 inches; light brownish gray (2.5Y 6/2), stratified silty clay loam and silt loam; many medium prominent strong brown (7.5YR 4/6) mottles; weak fine and medium subangular blocky structure; friable; few distinct dark gray (10YR 4/1) and very dark gray (10YR 3/1) organic coatings on faces of peds; common fine soft accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Cg—42 to 60 inches; light gray (N 6/0) and light brownish gray (2.5Y 6/2), stratified silty clay loam and silt loam; many medium prominent strong brown (7.5YR 4/6) mottles; massive; friable; common fine soft accumulations of iron and manganese oxide; neutral.

The solum ranges from 40 to 55 inches in thickness. The mollic epipedon ranges from 12 to 20 inches in thickness.

The Bg horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2. The Cg horizon has hue of 2.5Y or 10YR or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2.

Beavercreek Series

The Beavercreek series consists of deep, moderately well drained, moderately rapidly permeable soils on flood plains. These soils formed in loamy-skeletal alluvial and colluvial material. Slopes range from 0 to 2 percent.

The Beavercreek soils in this survey area are shallower to free carbonates than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils. The soils are classified as loamy-skeletal, mixed (calcareous), mesic Typic Udifluvents.

Typical pedon of Beavercreek silt loam, frequently flooded, 1,500 feet west and 370 feet south of the northeast corner of sec. 7, T. 26 N., R. 5 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; less than 1 percent chert fragments of gravel size; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C1—4 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; massive; friable; many very fine roots; common distinct dark brown (10YR 4/3) and brown (10YR 5/3) depositional strata; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; less than 1 percent chert fragments of gravel size; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C2—7 to 18 inches; brown (10YR 5/3) gravelly silt loam; massive; friable; few very fine roots; very dark gray (10YR 3/1) depositional strata of loam; about 20 percent chert and dolomite fragments of gravel size; slightly effervescent; mildly alkaline; abrupt smooth boundary.

2C3—18 to 32 inches; dark grayish brown (10YR 4/2) extremely gravelly loam; massive; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 70 percent chert and dolomite fragments of gravel size; strongly effervescent; mildly alkaline; abrupt smooth boundary.

2C4—32 to 52 inches; dark grayish brown (10YR 4/2) very gravelly loam that has depositional strata of coarse sand; massive; friable; common distinct very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) organic coatings on faces of peds; about 50 percent chert fragments of gravel size; violently effervescent; moderately alkaline; clear smooth boundary.

2Ab—52 to 57 inches; very dark gray (N 3/0) gravelly silt loam; few fine prominent light olive brown (2.5Y 5/6) mottles; weak medium and fine subangular blocky structure; friable; about 30 percent chert and dolomite fragments of gravel size; light olive brown (2.5Y 5/6) and olive yellow (2.5Y 6/6), weathered rock fragments; slightly effervescent; neutral; abrupt smooth boundary.

2Bgb—57 to 60 inches; dark grayish brown (2.5Y 4/2) very gravelly loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; about 70 percent chert and dolomite fragments of gravel size; common distinct very dark gray (N 3/0) organic coatings on faces of peds; strongly effervescent; mildly alkaline.

The depth to carbonates ranges from 0 to 10 inches. The loamy mantle and the 2C horizon have dolomite and chert fragments of gravel and cobble size.

The A and C horizons have value of 3 to 5 and chroma of 2 or 3. In the fine-earth fraction, they are silt loam or loam. The 2C horizon has value of 4 to 6 and chroma of 2 to 4. In the fine-earth fraction, it is silt loam or loam that has strata of sandy material.

Birds Series

The Birds series consists of deep, poorly drained, moderately slowly permeable soils on broad flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Birds silt loam, wet, 480 feet east and 1,700 feet south of the northwest corner of sec. 2, T. 28 N., R. 2 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; common fine prominent strong brown (7.5YR 4/6) and common fine distinct dark gray (10YR 4/1) mottles; friable; few very fine roots; common medium soft accumulations of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Cg1—8 to 20 inches; dark grayish brown (10YR 4/2) and dark gray (10YR 4/1) silt loam that has thin depositional strata of brown (10YR 5/3) and pale brown (10YR 6/3) silt; common medium prominent strong brown (7.5YR 4/6) mottles; massive; friable; few very fine and medium roots; common medium soft accumulations of iron and manganese oxide; mildly alkaline; gradual smooth boundary.

Cg2—20 to 38 inches; dark grayish brown (10YR 4/2) and dark gray (10YR 4/1) silt loam that has thin depositional strata of grayish brown (2 5Y 5/2) and light brownish gray (2.5Y 6/2) silt; common fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; common medium soft accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

Cg3—38 to 60 inches; dark grayish brown (2.5Y 4/2) silt loam that has thin strata of grayish brown (2.5Y 5/2) silt; common medium distinct dark gray (10YR 4/1) and common fine distinct dark yellowish brown (10YR 4/6) mottles; massive; friable; few very fine roots; neutral.

The solum is 5 to 15 inches thick. Some pedons have an ACg horizon. The Cg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2.

Bloomfield Series

The Bloomfield series consists of deep, somewhat excessively drained, rapidly permeable soils on uplands and stream terraces. These soils formed in sandy wind- and water-deposited material. Slopes range from 7 to 15 percent.

Typical pedon of Bloomfield loamy fine sand, 7 to 15 percent slopes, 20 feet east and 600 feet south of the northwest corner of sec. 17, T. 26 N., R. 2 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loamy fine sand, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure parting to weak medium granular; very friable; common very fine roots; mixed with fragments of yellowish brown (10YR 5/4) material in the lower part; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; mildly alkaline; abrupt smooth boundary.

E1—8 to 20 inches; light yellowish brown (10YR 6/4) fine sand; weak medium and fine subangular blocky structure; very friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

E2—20 to 32 inches; light yellowish brown (10YR 6/4) fine sand; weak medium subangular blocky structure; very friable; few very fine roots; few iron stains; neutral; clear smooth boundary.

E and Bt1—32 to 35 inches; strong brown (7.5YR 5/6) sand (E); single grain; loose; lamellae of brown (7.5YR 4/4) loamy sand (Bt) ½ to 1 inch thick; weak medium subangular blocky structure; very friable; few very fine roots; neutral; gradual smooth boundary.

E and Bt2—35 to 43 inches; yellowish brown (10YR 5/4) sand (E); single grain; loose; lamellae of reddish brown (5YR 4/4) loamy sand (Bt) about 1 inch thick; weak medium subangular blocky structure; very friable; few very fine roots; neutral; gradual smooth boundary.

E and Bt3—43 to 60 inches; light yellowish brown (10YR 6/4) sand (E); single grain; loose; lamellae of yellowish red (5YR 4/6) loamy sand (Bt) about 1 inch thick; weak medium subangular blocky structure; very friable; few very fine roots; neutral.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has value of 5 or 6 and chroma of 3 to 6. It is fine sand or loamy sand. The E part of the E and Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It is sand or loamy sand. The Bt part consists of lamellae, which have hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6.

Chelsea Series

The Chelsea series consists of deep, excessively drained, rapidly permeable soils on uplands. These soils formed in sandy eolian material. Slopes range from 20 to 45 percent.

Typical pedon of Chelsea loamy fine sand, 20 to 45 percent slopes, 470 feet south and 20 feet east of the northwest corner of sec. 17, T. 26 N., R. 2 E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) loamy fine sand, gray (10YR 5/1) dry; weak medium and fine granular structure; very friable; few very fine roots; yellowish brown (10YR 5/4) linings in root channels; neutral; abrupt smooth boundary.

E1—5 to 8 inches; dark brown (10YR 4/3) loamy fine sand; weak medium and fine granular structure; very friable; few very fine roots; fragments of yellowish brown (10YR 5/4) material in the lower part; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

E2—8 to 13 inches; yellowish brown (10YR 5/4) fine sand; weak medium subangular blocky structure; very friable; few very fine roots; common dark brown (10YR 4/3) and few very dark grayish brown (10YR 3/2) linings in root channels; slightly acid; gradual smooth boundary.

E3—13 to 26 inches; yellowish brown (10YR 5/4) fine sand; weak coarse subangular blocky structure; very friable; few very fine roots; slightly acid; clear smooth boundary.

E and Bt1—26 to 39 inches; yellowish brown (10YR 5/4) fine sand (E); single grain; loose; lamellae of brown (7.5YR 4/4) loamy sand and sandy loam (Bt) about ¼ inch thick; weak medium subangular blocky structure; very friable; few very fine roots; medium acid; gradual smooth boundary.

E and Bt2—39 to 50 inches; yellowish brown (10YR 5/4) fine sand (E); single grain; loose; lamellae of reddish brown (5YR 4/3) loamy sand (Bt) ¼ to 1 inch thick; weak medium subangular blocky structure; very friable; few very fine roots; slightly acid; gradual smooth boundary.

E and Bt3—50 to 60 inches; brown (10YR 5/3) fine sand (E); single grain; loose; lamellae of reddish brown (5YR 4/4) loamy sand (Bt) about ½ inch thick; weak medium subangular blocky structure; very friable; few very fine roots; slightly acid.

The A horizon is 3 to 6 inches thick. It has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 3 to 6. It is loamy fine sand or fine sand. The B part of the E and Bt horizon consists of lamellae, which have hue of 7.5YR or 5YR and value and chroma of 3 or 4.

Derinda Series

The Derinda series consists of moderately deep, moderately well drained, slowly permeable soils on uplands. These soils formed in loess and in the underlying material weathered from calcareous shale. Slopes range from 2 to 45 percent.

Typical pedon of Derinda silt loam, 10 to 15 percent slopes, eroded, 360 feet east and 1,450 feet south of the northwest corner of sec. 22, T. 28 N., R. 2 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

Bt1—8 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—17 to 24 inches; pale olive (5Y 6/3) silty clay; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds and along root channels; about 5 percent yellow (2.5Y 7/6), weathered shale fragments; neutral; gradual smooth boundary.

2Bt3—24 to 31 inches; pale olive (5Y 6/3) silty clay; few medium distinct light olive gray (5Y 6/2) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; common distinct brown (10YR 4/3) clay films on faces of peds and along root channels; about 5 percent yellow (2.5Y 8/6), weathered shale fragments; violently effervescent; mildly alkaline; clear smooth boundary.

2Bt4—31 to 35 inches; light olive gray (5Y 6/2) silty clay; moderate medium angular blocky structure; firm; few distinct brown (10YR 4/3) clay films on faces of peds and along root channels; about 5 percent yellow (2.5Y 8/6), weathered shale fragments; violently effervescent; mildly alkaline; clear smooth boundary.

2Cr—35 to 60 inches; light olive gray (5Y 6/2) silty clay

shale bedrock; massive; very firm; common distinct brown (10YR 4/3) films along root channels; about 20 percent yellow (2.5Y 8/6), weathered shale fragments; violently effervescent; moderately alkaline.

The depth to bedrock ranges from 25 to 40 inches. The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have an E or BE horizon. The 2Bt horizon has hue of 10YR, 2.5Y, 5Y, or 5GY, value of 5 to 7, and chroma of 1 to 6.

Dickinson Series

The Dickinson series consists of deep, somewhat excessively drained, moderately rapidly permeable soils on broad stream terraces. These soils formed in sandy alluvial material. Slopes range from 0 to 3 percent.

Typical pedon of Dickinson fine sandy loam, 0 to 3 percent slopes, 1,400 feet east and 1,580 feet north of the southwest corner of sec. 20, T. 26 N., R. 2 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sandy loam, gray (10YR 5/1) dry; weak medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

A—8 to 14 inches; very dark gray (10YR 3/1) fine sandy loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

Bw1—14 to 24 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw2—24 to 31 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BC—31 to 45 inches; dark yellowish brown (10YR 4/4) loamy fine sand; few thin bands of brown (10YR 4/3) fine sandy loam in the lower part; weak medium subangular blocky structure; very friable; few very fine roots; slightly acid; gradual smooth boundary.

C—45 to 60 inches; yellowish brown (10YR 5/4) loamy fine sand; few thin bands of dark yellowish brown (10YR 4/4) fine sandy loam; single grain; loose; slightly acid.

The solum ranges from 40 to 50 inches in thickness. The Bw horizon has value of 3 or 4 and chroma of 2 or 3. The C horizon has value of 4 or 5 and chroma of 3 or 4. A few thin high-chroma iron bands are below a depth of 40 inches in some pedons.

Dorchester Series

The Dorchester series consists of deep, moderately well drained, moderately permeable soils on flood plains. These soils formed in calcareous, stratified, silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Dorchester silt loam, occasionally flooded, 400 feet west and 580 feet south of the northeast corner of sec. 4, T. 28 N., R. 1 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; few fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C—8 to 22 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; common distinct brown (10YR 5/3) and pale brown (10YR 6/3) depositional strata; common distinct black (10YR 2/1) organic coatings on faces of peds; slightly effervescent; mildly alkaline; abrupt smooth boundary.

Ab1—22 to 33 inches; black (10YR 2/1) silt loam; weak fine granular structure; friable; few fine roots; strongly effervescent; mildly alkaline; gradual smooth boundary.

Ab2—33 to 60 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine and very fine subangular blocky structure; friable; common distinct black (10YR 2/1) organic coatings on faces of peds; about 5 percent sand; common fragments of snail shells; violently effervescent; moderately alkaline.

The thickness of the solum ranges from 5 to 10 inches. It is the same as the thickness of the Ap or A horizon. Depth to the Ab horizon ranges from 20 to 45 inches.

Downs Series

The Downs series consists of deep, moderately well drained, moderately permeable soils on upland ridges and side slopes and on stream terraces. These soils formed in loess. Slopes range from 2 to 10 percent.

Typical pedon of Downs silt loam, 5 to 10 percent slopes, eroded, 1,880 feet west and 480 feet south of the northeast corner of sec. 15, T. 27 N., R. 3 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to

moderate medium granular; friable; common very fine roots; mixed with common fragments of brown (10YR 4/3) material in the lower part; neutral; abrupt smooth boundary.

Bt1—9 to 12 inches; brown (10YR 4/3) silty clay loam; weak fine and medium subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bt2—12 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—23 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint brown (10YR 5/3) and few fine distinct light brownish gray (10YR 6/2) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; very few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt4—28 to 37 inches; brown (10YR 5/3) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; friable; very few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; common fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

BC—37 to 55 inches; brown (10YR 5/3) silty clay loam; many fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; very few very fine roots; very few distinct grayish brown (10YR 5/2) clay films on faces of peds; many fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

C—55 to 60 inches; brown (10YR 5/3) silt loam; many fine and medium distinct light brownish gray (10YR 6/2) and many fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; common fine accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 42 to 60 inches. Some pedons have a BE horizon. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The BC horizon is silt loam or silty clay loam.

Dubuque Series

The Dubuque series consists of moderately deep, well drained soils on uplands. These soils formed in loess and in the underlying material weathered from dolomitic limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 4 to 25 percent.

Typical pedon of Dubuque silt loam, 10 to 15 percent slopes, eroded, 2,600 feet west and 2,600 feet north of the southeast corner of sec. 28, T. 29 N., R. 2 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium and fine granular structure; friable; common very fine roots; mixed with fragments of yellowish brown (10YR 5/4) subsoil material in the lower part; neutral; clear smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and very fine subangular blocky structure; friable; common very fine roots; mixed with common fragments of dark grayish brown (10YR 4/2) material in the upper part; common distinct brown (10YR 4/3) clay films; slightly acid; gradual smooth boundary.

Bt2—13 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; common very fine roots; common distinct brown (10YR 4/3) clay films; medium acid; gradual smooth boundary.

Bt3—20 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots; common distinct brown (10YR 4/3) clay films; neutral; gradual smooth boundary.

2Bt4—29 to 33 inches; brown (7.5YR 5/4) and strong brown (7.5YR 5/6) silty clay; moderate medium and fine angular blocky structure; firm; many distinct dark brown (7.5YR 4/2) clay films on faces of peds; neutral; abrupt smooth boundary.

2R—33 to 60 inches; hard dolomitic limestone bedrock; about 1 inch of soft, yellow (10YR 8/6), fragmented limestone in the upper part.

The depth to dolomitic limestone bedrock ranges from 20 to 40 inches. The A or Ap horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have an E or BE horizon. The 2Bt horizon has value of 4 or 5 and chroma of 4 to 6.

Dunbarton Series

The Dunbarton series consists of shallow, well drained, moderately slowly permeable soils on uplands. These soils formed in a thin mantle of loess and in the

underlying material weathered from dolomitic limestone bedrock. Slopes range from 7 to 25 percent.

Typical pedon of Dunbarton silt loam, in an area of Dunbarton-Dubuque silt loams, 7 to 15 percent slopes, eroded, 1,220 feet west and 500 feet north of the southeast corner of sec. 25, T. 28 N., R. 2 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; fragments of brown (7.5YR 5/4) material in the lower part; moderate fine subangular blocky structure; friable; many fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt smooth boundary.

2Bt1—8 to 12 inches; brown (7.5YR 5/4) silty clay; moderate fine subangular blocky structure; firm; common fine roots; many distinct dark brown (7.5YR 4/4) clay films on faces of peds; common fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2Bt2—12 to 15 inches; brown (7.5YR 5/4) clay; weak medium prismatic structure parting to moderate medium subangular and angular blocky; very firm; common fine roots; many distinct dark brown (7.5YR 4/2) clay films on faces of peds; common fine accumulations of iron and manganese oxide; about 2 percent chert fragments of gravel size; neutral; clear smooth boundary.

2R—15 inches; hard, level-bedded dolomite bedrock; about 4 inches of fragmented dolomite in the upper part; brown (7.5YR 5/4) clay loam in the fissures.

The depth to dolomitic limestone bedrock ranges from 12 to 20 inches. The mantle of loess ranges from 6 to 15 inches in thickness.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The 2Bt horizon has hue of 10YR or 7.5YR, value 4 or 5, and chroma of 3 or 4. It is silty clay or clay.

Elco Series

The Elco series consists of deep, moderately well drained soils on uplands. These soils formed in loess and in the underlying paleosol, which formed in Illinoian glacial till. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 5 to 10 percent.

Typical pedon of Elco silt loam, 5 to 10 percent slopes, eroded, 2,520 feet west and 2,460 feet north of the southeast corner of sec. 16, T. 27 N., R. 5 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to moderate fine and medium granular; friable; few very fine roots; mixed with fragments of yellowish brown (10YR 5/4) material in the lower part; few distinct light gray (10YR 7/2) silt coatings on faces of peds; neutral; abrupt smooth boundary.

Bt1—5 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

Bt2—14 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bt3—23 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds and along root channels; common fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bt4—29 to 34 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds and along root channels; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2Btg1—34 to 40 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2Btg2—40 to 48 inches; dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few fine distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; about 2 percent fine glacial pebbles; neutral; clear smooth boundary.

2Btg3—48 to 60 inches; dark gray (10YR 4/1) silty clay; common fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few medium distinct light gray

(10YR 7/2) silt coatings on faces of peds; common fine accumulations of iron and manganese oxide; about 2 percent fine glacial pebbles; neutral.

The thickness of the solum ranges from 48 to more than 60 inches. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The 2Btg horizon has value of 4 to 6 and chroma of 1 to 6. It is loam, clay loam, silty clay loam, or silty clay.

Eleroy Series

The Eleroy series consists of deep, moderately well drained soils on uplands. These soils formed in loess and in the underlying material weathered from calcareous shale. Permeability is moderate in the upper part of the solum and very slow in the lower part. Slopes range from 5 to 25 percent.

Typical pedon of Eleroy silt loam, 10 to 15 percent slopes, eroded, 1,700 feet south and 2,360 feet west of the northeast corner of sec. 32, T. 28 N., R. 2 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium and fine subangular blocky structure parting to moderate fine granular; friable; common very fine roots; fragments of yellowish brown (10YR 5/4) subsoil material in the lower part; neutral; clear smooth boundary.

Bt1—6 to 13 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; common very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bt2—13 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds and along root channels; common fine accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

Bt3—20 to 29 inches; brown (10YR 5/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and reddish yellow (7.5YR 6/6) mottles; weak medium prismatic structure parting to weak medium and fine subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

Bt4—29 to 38 inches; brown (10YR 5/3) silt loam; many fine distinct light brownish gray and common fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium prismatic structure parting to weak medium and fine subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films along root channels; common fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

BC—38 to 46 inches; light olive gray (5Y 6/2) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few distinct olive gray (5Y 5/2) clay films on faces of peds; few distinct dark grayish brown (10YR 4/2) clay films along root channels; about 2 percent chert and weathered dolomite and shale fragments of gravel size; violently effervescent; mildly alkaline; abrupt smooth boundary.

2Cr—46 to 60 inches; light olive gray (5Y 6/2) silty clay loam shale bedrock; massive; firm; about 2 percent chert and weathered dolomite and shale fragments of gravel size; violently effervescent; mildly alkaline.

The depth to bedrock ranges from 40 to 60 inches. The thickness of the loess ranges from 35 to 50 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is silt loam or silty clay loam. The 2B horizon, if it occurs, has value of 4 to 7 and chroma of 2 to 4. It is silty clay loam or silty clay.

Elizabeth Series

The Elizabeth series consists of shallow, somewhat excessively drained, moderately permeable soils on uplands. These soils formed in loamy material weathered from the underlying limestone bedrock. Slopes range from 7 to 15 percent.

Typical pedon of Elizabeth silt loam, 7 to 15 percent slopes, 1,900 feet west and 560 feet south of the northeast corner of sec. 10, T. 27 N., R. 2 E.

A1—0 to 6 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; many fine and very fine roots; less than 10 percent limestone cobbles; mildly alkaline; clear smooth boundary.

A2—6 to 10 inches; very dark grayish brown (10YR 3/2) cobbly silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure parting to moderate medium granular; friable; many

fine and very fine roots; about 25 percent limestone cobbles; slightly effervescent; mildly alkaline; clear smooth boundary.

A3—10 to 19 inches; dark brown (10YR 3/3) extremely cobbly loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; few fine and very fine roots; about 85 percent cobbles 3 to 6 inches in size; slightly effervescent; mildly alkaline; diffuse wavy boundary.

2R—19 inches; fractured dolomitic limestone bedrock; some dark silt loam in the cracks in the upper few inches.

The depth to dolomitic limestone bedrock ranges from 10 to 20 inches. The fine-earth fraction of the A horizon is silt loam or loam.

Fayette Series

The Fayette series consists of deep, well drained, moderately permeable soils on side slopes and ridges in the uplands. These soils formed in loess. Slopes range from 2 to 40 percent.

Typical pedon of Fayette silt loam, 2 to 5 percent slopes, eroded, 2,500 feet south and 200 feet west of the northeast corner of sec. 22, T. 27 N., R. 1 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 12 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine angular and subangular blocky structure; friable; many fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; many fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—21 to 34 inches; yellowish brown (10YR 5/4) silt loam; moderate fine prismatic structure parting to moderate medium angular blocky; friable; many fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

BC—34 to 47 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure; friable; common fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; very few distinct light brownish gray (10YR 6/2) coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

C—47 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; few fine accumulations of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 40 to more than 60 inches. The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon, if it occurs, has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has value and chroma of 4 or 5.

Flagg Series

The Flagg series consists of deep, well drained, moderately permeable soils on ridgetops and side slopes in the uplands. These soils formed in loess and in the underlying paleosol, which formed in Illinoian glacial till. Slopes range from 2 to 10 percent.

The Flagg soils in this survey area are characterized by a smaller decrease in content of clay within a depth of 60 inches than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils. The soils are classified as fine-silty, mixed, mesic Typic Paleudalfs.

Typical pedon of Flagg silt loam, 2 to 5 percent slopes, eroded, 2,400 feet west and 2,060 feet south of the northeast corner of sec. 33, T. 26 N., R. 5 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

Bt1—7 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—15 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—21 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium angular and subangular blocky structure; friable; common fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; many distinct light gray (10YR 72) silt coatings on faces of peds; about 2 percent chert fragments of gravel size; strongly acid; clear smooth boundary.

Bt4—31 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate coarse subangular blocky; friable; common fine roots; many distinct

brown (10YR 5/3) clay films on faces of peds; many distinct light gray (10YR 7/2) silt coatings on faces of peds; about 2 percent chert fragments of gravel size; very strongly acid; clear smooth boundary.

2Bt5—40 to 47 inches; brown (7.5YR 4/4) silty clay loam; moderate coarse subangular blocky structure; firm; few fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; common fine accumulations of iron and manganese oxide; about 15 percent chert fragments of gravel size; strongly acid; clear smooth boundary.

2Bt6—47 to 60 inches; yellowish red (5YR 4/6) sandy clay loam; weak coarse prismatic structure; firm; few fine roots; common distinct reddish brown (5YR 4/4) clay films on faces of peds; many fine accumulations of iron and manganese oxide; about 2 percent chert fragments of gravel size; medium acid.

The thickness of the loess ranges from 30 to 45 inches. Some pedons have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is silt loam or silty clay loam. The 2Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6.

Frankville Series

The Frankville series consists of moderately deep, well drained soils on uplands. These soils formed in loess and in the underlying material weathered from dolomite limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 4 to 10 percent.

Typical pedon of Frankville silt loam, 4 to 10 percent slopes, eroded, 2,200 feet south and 420 feet east of the northwest corner of sec. 21, T. 29 N., R. 5 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Bt1—7 to 11 inches; brown (10YR 4/3) silt loam; moderate medium and thin platy structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct very dark gray (10YR 3/1) and many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—11 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—18 to 24 inches; yellowish brown (10YR 5/4) silty clay loam; strong medium and fine subangular blocky structure; friable; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Bt4—24 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine angular blocky structure; friable; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; common distinct very pale brown (10YR 7/3) silt coatings on faces of peds; slightly acid; abrupt smooth boundary.

2Bt5—30 to 34 inches; brown (7.5YR 5/4) silty clay; moderate fine prismatic structure parting to moderate medium subangular blocky; very firm; few very fine roots; fragments of dark brown (7.5YR 4/4) material in the lower part; common distinct dark brown (10YR 4/2) and few distinct dark brown (7.5YR 3/2) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2R—34 inches; hard, level-bedded dolomite bedrock; less than 3 inches of brownish yellow (10YR 6/6), fragmented dolomite in the upper part; brown (7.5YR 4/4) sandy clay loam residuum in the fissures.

The depth to limestone bedrock ranges from 20 to 40 inches. The thickness of the loess ranges from 18 to 35 inches.

Some pedons have a BE horizon. The BE and Bt horizons have value of 4 or 5 and chroma of 3 or 4. The 2B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4.

Hoopeston Series

The Hoopeston series consists of deep, somewhat poorly drained, moderately rapidly permeable soils on stream terraces. These soils formed in loamy and sandy sediments. Slopes range from 0 to 2 percent.

Typical pedon of Hoopeston loam, 2,300 feet west and 1,300 feet south of the northeast corner of sec. 11, T. 26 N., R. 1 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate medium granular; friable; few very fine roots; medium acid; clear smooth boundary.

A—11 to 16 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak medium subangular

blocky structure parting to moderate medium granular; friable; few very fine roots; fragments of brown (10YR 4/3) subsoil material in the lower part; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 24 inches; brown (10YR 4/3) sandy loam; few fine prominent strong brown (7.5YR 4/6) mottles; weak medium and fine subangular blocky structure; very friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds and along root channels; neutral; clear smooth boundary.

Bt2—24 to 30 inches; yellowish brown (10YR 5/4) sandy loam; few fine prominent strong brown (7.5YR 4/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak medium and fine subangular blocky structure; very friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; few fine accumulations of iron and manganese oxide; about 2 percent fine pebbles; neutral; clear smooth boundary.

BC—30 to 50 inches; yellowish brown (10YR 5/4), stratified loamy sand and sandy loam having a few thin strata of loam; common fine prominent strong brown (7.5YR 4/6 and 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; very friable; few fine accumulations of iron and manganese oxide; about 2 percent fine pebbles; neutral; abrupt smooth boundary.

C—50 to 60 inches; light brownish gray (2.5Y 6/2) silt loam that has thin strata of loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; neutral.

The thickness of the solum ranges from 30 to 54 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The B horizon has value of 4 or 5 and chroma of 1 to 4. It is dominantly sandy loam, loamy sand, fine sandy loam, or loamy fine sand but has strata of loam in the lower part. The C horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 6. It is stratified silt loam and loam.

Huntsville Series

The Huntsville series consists of deep, well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Huntsville silt loam, frequently flooded, 1,500 feet east and 1,600 feet north of the southwest corner of sec. 22, T. 26 N., R. 2 E.

Ap—0 to 7 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A1—7 to 20 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common fine roots; neutral; gradual smooth boundary.

A2—20 to 28 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; common fine roots; neutral; clear smooth boundary.

AC1—28 to 33 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; common fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

AC2—33 to 37 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak coarse subangular blocky structure; friable; common medium roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

C—37 to 60 inches; dark brown (10YR 4/3) silt loam; massive; friable; common medium roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 25 to 50 inches. Some pedons have strata of sandy loam below a depth of 40 inches. Some do not have an AC horizon.

Lacrescent Series

The Lacrescent series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in a thin mantle of loess and in the underlying loamy-skeletal colluvial sediments derived from dolomitic bedrock. Slopes range from 15 to 50 percent.

Typical pedon of Lacrescent silty clay loam, 30 to 50 percent slopes, 1,840 feet east and 2,560 feet south of the northwest corner of sec. 32, T. 28 N., R. 2 E.

A1—0 to 5 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium and fine granular structure; friable; common fine and few

medium roots; about 2 percent dolomite fragments of gravel size; slightly effervescent; neutral; clear smooth boundary.

A2—5 to 11 inches; very dark gray (10YR 3/1) gravelly silty clay loam, gray (10YR 5/1) dry; moderate medium and fine granular structure; friable; common fine and few medium roots; many distinct black (10YR 2/1) organic coatings on faces of peds; about 20 percent dolomite fragments of gravel size; slightly effervescent; neutral; clear smooth boundary.

A3—11 to 18 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; many distinct very dark gray organic coatings on faces of peds; about 40 percent dolomite fragments of gravel size; slightly effervescent; mildly alkaline; clear smooth boundary.

BA—18 to 24 inches; brown (10YR 4/3) very gravelly silt loam; moderate fine subangular blocky structure parting to moderate medium granular; friable; very few fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; about 50 percent dolomite fragments of gravel size and some of cobble size; strongly effervescent; mildly alkaline; clear smooth boundary.

Bw1—24 to 34 inches; yellowish brown (10YR 5/4) very cobbly silt loam; moderate fine and very fine subangular blocky structure; friable; very few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; about 50 percent dolomite fragments of cobble size; strongly effervescent; moderately alkaline; clear smooth boundary.

Bw2—34 to 45 inches; yellowish brown (10YR 5/4) very cobbly silt loam; moderate medium subangular blocky structure; friable; very few fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; about 50 percent dolomite fragments of cobble size; violently effervescent; moderately alkaline; gradual smooth boundary.

C—45 to 60 inches; brown (10YR 5/3) very gravelly silt loam; massive; friable; very few fine roots; pale brown (10YR 6/3) streaks of lime; about 50 percent dolomite fragments of gravel size; violently effervescent; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The depth to dolomitic limestone bedrock ranges from 45 to more than 60 inches. The content of rock fragments ranges from 35 to 60 percent in the control section. The rock fragments are pebbles, cobbles, or flagstones. The mollic epipedon ranges from 15 to 20 inches in thickness. The C horizon is silt loam or fine sandy loam in the fine-earth fraction.

Lamoille Series

The Lamoille series consists of deep, well drained soils on uplands. These soils formed in loess and in the underlying clayey sediments and loamy-skeletal dolomitic limestone colluvium. Permeability is slow in the upper part of the solum and moderately rapid in the lower part. Slopes range from 15 to 35 percent.

Typical pedon of Lamoille silt loam, in an area of NewGlarus-Lamoille silt loams, 15 to 35 percent slopes, 900 feet west and 50 feet south of the northeast corner of sec. 31, T. 28 N., R. 2 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium and fine granular structure; friable; common fine and very fine roots; fragments of brown (10YR 5/3) subsoil material in the lower part; neutral; clear smooth boundary.

E—6 to 10 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; weak medium platy structure; friable; few fine and very fine roots; about 2 percent dolomite fragments of cobble size; slightly acid; clear smooth boundary.

Bt1—10 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few fine and very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; about 2 percent chert fragments of gravel size; slightly acid; gradual smooth boundary.

2Bt2—16 to 24 inches; yellowish brown (10YR 5/6) gravelly silty clay; strong medium and fine angular blocky structure; firm; few fine and very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; about 20 percent angular chert and dolomite fragments of gravel size; neutral; clear wavy boundary.

2Bt3—24 to 38 inches; yellowish brown (10YR 5/6) cobbly silty clay; moderate medium subangular blocky structure; firm; few fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; about 35 percent dolomite fragments of cobble and gravel size; neutral; gradual wavy boundary.

2Bt4—38 to 60 inches; light yellowish brown (10YR 6/4) very cobbly silt loam; moderate medium and fine subangular blocky structure; friable; few fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; about 50 percent dolomite fragments of

cobble and gravel size; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 35 to more than 60 inches. The thickness of the loess ranges from 5 to 20 inches. The depth to carbonates ranges from 15 to 40 inches.

The A or Ap horizon has value of 3 or 4 and chroma of 1 or 2. Some pedons do not have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is silt loam or silty clay loam. The 2B horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. In the fine-earth fraction, it is silty clay or clay. It has 15 to 35 percent dolomite or chert fragments of gravel, cobble, and stone size. The 3B horizon, if it occurs, has hue of 10YR or 7.5YR and value and chroma of 4 to 6. In the fine-earth fraction, it is silt loam, clay loam, or silty clay loam. The 3C horizon, if it occurs, is silt loam or loam in the fine-earth fraction. The 3B and 3C horizons have 35 to 60 percent dolomite fragments of gravel, cobble, and stone size.

Lamont Series

The Lamont series consists of deep, well drained, moderately rapidly permeable soils on uplands and stream terraces. These soils formed in loamy and sandy eolian material. Slopes range from 1 to 15 percent.

Typical pedon of Lamont fine sandy loam, 1 to 7 percent slopes, 860 feet north and 1,360 feet west of the southeast corner of sec. 21, T. 26 N., R. 2 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam, dark brown (10YR 4/3) dry; weak medium granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; many fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—13 to 18 inches; brown (7.5YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; many fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—18 to 23 inches; brown (7.5YR 5/4) fine sandy loam; weak medium and fine subangular blocky structure; very friable; many fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

E and Bt—23 to 60 inches; brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) fine sand and sand (E); single grain; loose; lamellae of brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) fine sandy loam (Bt) 1 to 3 inches thick; weak medium subangular blocky structure; very friable; few fine roots; neutral.

The thickness of the solum ranges from 30 to 60 inches. The Ap and Bt horizons are fine sandy loam or loam. The Bt horizon has value and chroma of 4 to 6. The E and Bt horizon has value and chroma of 4 or 5. The E part is loamy fine sand or fine sand. The Bt part consists of lamellae of fine sandy loam or loamy sand.

Lawson Series

The Lawson series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Lawson silt loam, frequently flooded, 2,330 feet east and 1,000 feet south of the northwest corner of sec. 11, T. 28 N., R. 4 E.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium and fine granular structure; friable; few fine roots; many distinct dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

A2—6 to 13 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure parting to moderate medium granular; friable; few fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A3—13 to 27 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; common medium faint dark grayish brown (10YR 4/2) mottles; moderate medium and fine subangular blocky structure; friable; few fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C1—27 to 37 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium and fine subangular blocky structure; friable; few fine roots; few thin dark grayish brown (10YR 4/2) depositional strata; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C2—37 to 43 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent brown (7.5YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; friable; few fine roots; few thin brown (10YR 5/3) depositional strata; common distinct very dark gray

(10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C3—43 to 60 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine prominent brown (7.5YR 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common thin depositional strata of brown (10YR 5/3) loam; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; neutral.

The C horizon has value of 3 to 5 and chroma of 1 or 2. Some pedons have thin strata of fine sand below a depth of 40 inches.

Loran Series

The Loran series consists of deep, somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess and in the underlying silty material weathered from calcareous shale. Slopes range from 3 to 7 percent.

Typical pedon of Loran silty clay loam, 3 to 7 percent slopes, 1,180 feet east and 760 feet north of the southwest corner of sec. 23, T. 29 N., R. 3 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

A—10 to 15 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; common fine faint dark grayish brown (10YR 4/2) mottles; moderate medium granular structure; friable; few very fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—15 to 19 inches; olive brown (2.5Y 4/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—19 to 27 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few distinct dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt3—27 to 35 inches; light olive brown (2.5Y 5/4) silt loam; few fine distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

BC—35 to 41 inches; pale yellow (2.5Y 7/4) silty clay loam; few fine distinct olive yellow (2.5Y 6/8) and few fine prominent greenish gray (5GY 6/1) mottles; weak medium subangular blocky structure; friable; about 10 percent shale fragments of gravel size; strongly effervescent; mildly alkaline; abrupt smooth boundary.

2Cr—41 inches; light brownish gray (2.5Y 6/2), calcareous shale bedrock.

The depth to bedrock ranges from 40 to 60 inches. The thickness of the loess ranges from 30 to 40 inches.

The Bt horizon has value of 3 to 5 and chroma of 2 to 4. A thin layer of glacial till is between the loess and the shale residuum in some pedons. The BC horizon has hue of 2.5Y, 5Y, or 5G, value of 5 to 7, and chroma of 1 to 4. It is silty clay loam, silt loam, or clay loam.

Massbach Series

The Massbach series consists of deep, moderately well drained soils on uplands. These soils formed in loess and in the underlying material weathered from calcareous shale. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 2 to 15 percent.

Typical pedon of Massbach silt loam, 5 to 10 percent slopes, eroded, 120 feet east and 2,420 feet south of the northwest corner of sec. 26, T. 29 N., R. 3 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to moderate medium granular; friable; few fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; fragments of yellowish brown (10YR 5/4) subsoil material in the lower part; neutral; abrupt smooth boundary.

Bt1—6 to 11 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and very fine subangular blocky structure; friable; few very fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; slightly acid; clear smooth boundary.

Bt2—11 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; strong medium and fine subangular blocky structure; friable; few very fine roots; many

distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—17 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium and fine subangular blocky; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt4—27 to 38 inches; brown (10YR 5/3) silty clay loam; many fine distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Bt5—38 to 45 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silty clay loam; weak medium prismatic structure; friable; few very fine roots; few distinct gray (10YR 5/1) and dark gray (10YR 4/1) clay films on faces of peds and along root channels; common fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

2BC—45 to 49 inches; mottled light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/6), and light yellowish brown (2.5Y 6/4) silty clay loam that has a thin lens of silt loam; weak medium prismatic structure; firm; few very fine roots; few fine accumulations of iron and manganese oxide; few shale fragments of gravel size; neutral; abrupt smooth boundary.

2Cr—49 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay shale bedrock; many fine faint olive yellow (2.54 6/6) and few fine distinct light brownish gray (2.5Y 6/2) mottles; massive; very firm; about 2 percent shale fragments of gravel size; few fine accumulations of iron and manganese oxide; strongly effervescent; mildly alkaline.

The depth to bedrock ranges from 40 to 60 inches. The thickness of the loess ranges from 35 to 50 inches.

The Bt horizon has value of 4 to 6 and chroma of 2 to 6. The 2BC horizon has hue of 10YR, 2.5Y, or 5GY, value of 4 to 6, and chroma of 1 to 6. It is silty clay or silty clay loam.

Medary Series

The Medary series consists of deep, moderately well drained, slowly permeable soils on terraces. These soils formed in loess or silty deposits and in the underlying stratified, clayey and silty lacustrine deposits. Slopes range from 3 to 45 percent.

Typical pedon of Medary silty clay loam, 15 to 45 percent slopes, eroded, 1,220 feet north and 700 feet east of the southwest corner of sec. 22, T. 26 N., R. 2 E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; many very fine roots; fragments of reddish brown (5YR 5/4) subsoil material in the lower part; slightly acid; abrupt smooth boundary.

2Bt1—5 to 11 inches; reddish brown (5YR 5/4) clay; moderate fine subangular blocky structure; firm; common very fine roots; common distinct reddish brown (5YR 5/3) clay films on faces of peds; few distinct brown (7.5YR 4/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

2Bt2—11 to 20 inches; brown (7.5YR 5/4) silty clay; few medium distinct reddish brown (5YR 5/3) and few fine distinct brown (7.5YR 5/2) mottles; moderate fine angular blocky structure; firm; common very fine roots; common distinct dark brown (7.5YR 4/4) and reddish brown (5YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt3—20 to 32 inches; stratified reddish brown (5YR 5/4) silty clay, light olive brown (2.5Y 5/4) silty clay loam, and light brownish gray (2.5Y 6/2) silt loam; few fine distinct olive yellow (2.5Y 6/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct reddish brown (5YR 5/3) and dark brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

2Bt4—32 to 40 inches; stratified brown (7.5YR 5/4) and light brownish gray (2.5Y 6/2) silt loam and reddish brown (5YR 5/4) silty clay; common fine distinct strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct reddish brown (5YR 5/3) clay films on faces of peds; neutral; gradual smooth boundary.

2BC—40 to 46 inches; stratified strong brown (7.5YR

5/6 and 5/8) and light brownish gray (2.5Y 6/2) silt loam and reddish brown (5YR 4/3) silty clay; moderate coarse and medium subangular blocky structure; friable; few very fine roots; few distinct dark reddish brown (5YR 3/2) and reddish brown (5YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2C—46 to 60 inches; stratified strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) silt loam and reddish brown (5YR 4/3) and dark reddish gray (5YR 4/2) silty clay; massive; friable; few very fine roots; few concretions of calcium carbonate; weakly effervescent; mildly alkaline.

The thickness of the solum ranges from 30 to 50 inches. The loess or silty material is less than 10 inches thick.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The 2Bt horizon has hue of 5YR, 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma 2 to 8. It is dominantly clay or silty clay, but it has strata of silty clay loam, loam, or silt loam in the lower part. The 2C horizon has hue of 5YR, 7.5YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 8. It is stratified silt loam, silty clay, silty clay loam, or loam.

Miami Series

The Miami series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in a thin mantle of loess and in the underlying calcareous, loamy glacial till. Slopes range from 10 to 15 percent.

Typical pedon of Miami silt loam, 10 to 15 percent slopes, eroded, 40 feet east and 120 feet south of the northwest corner of sec. 28, T. 27 N., R. 5 E.

Ap—0 to 8 inches; mixed dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam, light brownish gray (10YR 6/2) and pale brown (10YR 6/3) dry; weak medium subangular blocky structure parting to moderate fine and medium granular; friable; common very fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 18 inches; brown (10YR 5/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2Bt2—18 to 28 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct brown (10YR 4/3) clay films along root channels; about 2 percent glacial pebbles; slightly acid; clear smooth boundary.

2BC—28 to 37 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct light yellowish brown (2.5Y 6/4) mottles; weak fine and medium subangular blocky structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; about 5 percent glacial pebbles; weakly effervescent; moderately alkaline; clear smooth boundary.

2C1—37 to 48 inches; light yellowish brown (10YR 6/4) and brown (10YR 4/3) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; massive; friable; about 5 percent glacial pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

2C2—48 to 60 inches; light yellowish brown (10YR 6/4) and dark brown (7.5YR 4/4) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; about 5 percent glacial pebbles; weakly effervescent; moderately alkaline.

The thickness of the solum ranges from 30 to 40 inches. The depth to carbonates ranges from 25 to 40 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. The Bt and 2Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. The 2C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. It is clay loam, loam, or silt loam.

Muscatine Series

The Muscatine series consists of deep, somewhat poorly drained, moderately permeable soils on broad upland ridges and on stream terraces. These soils formed in loess. Slopes range from 1 to 3 percent.

Typical pedon of Muscatine silt loam, 1 to 3 percent slopes, 210 feet north and 2,440 feet west of the southeast corner of sec. 9, T. 28 N., R. 5 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate very fine granular; friable; many very fine roots; neutral; clear smooth boundary.

A—7 to 11 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; common very fine roots; neutral; abrupt smooth boundary.

AB—11 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; common very fine roots; common distinct black (10YR 2/1) organic

coatings on faces of peds; neutral; clear smooth boundary.

Bt1—14 to 22 inches; brown (10YR 4/3) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium and fine subangular blocky structure; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds and along root channels; slightly acid; gradual smooth boundary.

Bt2—22 to 31 inches; brown (10YR 5/3) silty clay loam; many medium and fine distinct grayish brown (10YR 5/2) and common fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to moderate medium and fine subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Btg—31 to 42 inches; grayish brown (10YR 5/2) silty clay loam; many medium and fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and along root channels; common fine accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

BCg—42 to 51 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium and fine prominent dark yellowish brown (10YR 4/6) and few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak coarse and medium subangular blocky; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and along root channels; very few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; common fine accumulations of manganese oxide; slightly acid; gradual smooth boundary.

2Cg—51 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many medium and fine prominent dark yellowish brown (10YR 4/6) and few fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; very few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; common fine accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 45 to 60 inches. The Bt horizon has value of 4 to 6 and chroma of 2 to 4.

Nasset Series

The Nasset series consists of deep, well drained soils on uplands. These soils formed in loess and in the underlying material weathered from dolomitic limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 2 to 15 percent.

Typical pedon of Nasset silt loam, 5 to 10 percent slopes, eroded, 1,360 feet east and 430 feet south of the northwest corner of sec. 24, T. 28 N., R. 4 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 16 inches; dark yellowish brown (10YR 5/4) silty clay loam; weak fine subangular blocky structure; friable; few very fine roots; fragments of very dark grayish brown (10YR 3/2) surface soil material in the upper part; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium and fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt3—26 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt4—36 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium and fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; fragments of brown (7.5YR 5/4) residuum in the lower part; few fine accumulations of iron and manganese oxide; about 2 percent chert fragments of gravel size; slightly acid; clear smooth boundary.

2Bt5—44 to 54 inches; brown (7.5YR 5/4) silty clay; common medium distinct reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; firm; few distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; about 2 percent chert fragments of gravel size; slightly acid; clear smooth boundary.

2BC—54 to 58 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky

structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; few fine accumulations of manganese oxide; about 10 percent dolomite fragments and 2 percent chert fragments, both of gravel size; mildly alkaline; gradual smooth boundary.

2R—58 inches; hard, level-bedded dolomitic limestone bedrock.

The depth to dolomitic limestone bedrock ranges from 45 to 60 inches. Pedons in uncultivated areas have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay or silty clay loam. The 2C horizon, if it occurs, consists of fractured dolomite. The fine-earth material between the fractures is sand to silty clay.

NewGlarus Series

The NewGlarus series consists of moderately deep, well drained soils on uplands. These soils formed in loess and in the underlying material weathered from dolomitic limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 7 to 35 percent.

Typical pedon of NewGlarus silt loam, in an area of NewGlarus-Lamoille silt loams, 15 to 35 percent slopes, 980 feet south and 2,490 feet west of the northeast corner of sec. 17, T. 26 N., R. 5 E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; about 2 percent chert fragments of gravel size; neutral; abrupt smooth boundary.

BE—5 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium platy structure parting to moderate medium and fine subangular blocky; friable; few fine roots; many distinct dark brown (10YR 3/3) organic coatings on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; about 10 percent chert fragments of gravel size; neutral; clear smooth boundary.

Bt1—14 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; strong medium and fine angular blocky structure; firm; few fine and medium roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; about 10 percent chert fragments of gravel size; medium acid; abrupt smooth boundary.

2Bt2—22 to 34 inches; strong brown (7.5YR 5/6) gravelly silty clay; strong medium and fine angular blocky structure; firm; few medium roots; many prominent reddish brown (5YR 3/2) clay films on faces of peds; about 20 percent chert fragments of gravel size and dolomite fragments of cobble and stone size in the lower part; neutral; clear wavy boundary.

2R—34 inches; level-bedded dolomite bedrock; about 6 inches of yellow (10YR 7/6), fragmented dolomite in the upper part; strong brown (7.5YR 5/6) silty clay residuum in the fissures.

The depth to dolomitic limestone bedrock ranges from 25 to 40 inches. The thickness of the loess ranges from 15 to 30 inches. The content of rock fragments ranges from 0 to 15 percent in the loess and from 10 to 25 percent in the residuum. The rock fragments are of gravel, cobble, and stone size.

The E horizon, if it occurs, has value of 4 or 5 and chroma of 2 to 4. The 2Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 6.

Niota Series

The Niota series consists of deep, poorly drained soils on stream terraces. These soils formed in loess or silty material and in the underlying clayey lacustrine sediments. Permeability is very slow in the solum and moderate in the underlying material. Slopes range from 0 to 2 percent.

Typical pedon of Niota silt loam, 2,200 feet east and 820 feet north of the southwest corner of sec. 30, T. 26 N., R. 3 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; very friable; few very fine roots; neutral; abrupt smooth boundary.

E—8 to 12 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/4) mottles; weak medium platy structure; very friable; few very fine roots; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

BE—12 to 15 inches; light brownish gray (2.5Y 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/4) mottles; weak medium platy structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; medium acid; abrupt smooth boundary.

2Btg1—15 to 20 inches; light brownish gray (2.5Y 6/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm; few very fine roots; many distinct

grayish brown (2.5Y 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

2Btg2—20 to 25 inches; light brownish gray (2.5Y 6/2) silty clay; common fine prominent yellowish red (5YR 5/8) mottles; weak medium prismatic structure; firm; few very fine roots; fragments of reddish brown (5YR 4/4) material in the lower part; many distinct grayish brown (2.5Y 5/2) clay films on pressure faces; medium acid; gradual smooth boundary.

2Btg3—25 to 34 inches; reddish brown (2.5Y 4/4) clay; few fine prominent yellowish red (5YR 5/8) mottles; weak medium prismatic structure; very firm; few very fine roots; few thin bands of light brownish gray (2.5Y 6/2) clay; few distinct grayish brown (2.5Y 5/2) clay films on pressure faces; medium acid; clear smooth boundary.

2Btg4—34 to 45 inches; stratified brown (7.5YR 5/4) and reddish brown (5YR 5/4) silty clay and light olive gray (5Y 6/2) silty clay loam; common fine prominent yellowish red (5YR 5/8) mottles; weak medium prismatic structure; firm; few very fine roots; few distinct dark gray (5Y 4/1) clay films along root channels; few distinct olive gray (5Y 5/2) clay films on faces of peds; common medium and fine accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

2Cg—45 to 60 inches; gray (5Y 6/1) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few very fine roots; common medium and fine accumulations of manganese oxide; neutral.

The E horizon has value of 4 to 6 and chroma of 1 or 2. The 2B horizon has hue of 2.5Y to 5Y, value of 4 to 6, and chroma of 2 to 4. The 3B horizon, if it occurs, has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam. The 3C horizon, if it occurs, is dominantly silt loam but has strata of silty clay loam, sandy loam, or loamy fine sand.

Orion Series

The Orion series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium over an older buried soil. Slopes range from 0 to 2 percent.

Typical pedon of Orion silt loam, occasionally flooded, 1,280 feet west and 260 feet north of the southeast corner of sec. 9, T. 26 N., R. 4 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

C—9 to 27 inches; dark brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; massive; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) and brown (10YR 5/3) depositional strata; mildly alkaline; abrupt smooth boundary.

Ab1—27 to 38 inches; black (10YR 2/1) silt loam; moderate fine and very fine subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/3) depositional strata in the upper part; mildly alkaline; clear smooth boundary.

Ab2—38 to 43 inches; black (10YR 2/1) silty clay loam; moderate medium granular structure; friable; few very fine roots; mildly alkaline; clear smooth boundary.

Ab3—43 to 50 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium granular structure; friable; few very fine roots; fragments of dark grayish brown (10YR 4/2) material in the lower part; mildly alkaline; clear smooth boundary.

Bgb—50 to 56 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct light olive brown (2.5Y 5/4) mottles; weak fine subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

C′—56 to 60 inches; dark grayish brown (2.5Y 4/2) silt loam; common medium distinct light olive brown (2.5Y 5/4) and light yellowish brown (2.5Y 6/4) mottles; weak fine and very fine subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; mildly alkaline.

Depth to the Ab horizon ranges from 20 to 35 inches. The Ap or A horizon has value of 4 or 5 and chroma of 2 or 3. The Ab horizon is silt loam or silty clay loam. The Bgb and C′ horizons have value of 4 or 5 and chroma of 1 or 2.

Palsgrove Series

The Palsgrove series consists of deep, well drained soils on uplands. These soils formed in loess and in the underlying material weathered from dolomitic limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slopes range from 2 to 25 percent.

Typical pedon of Palsgrove silt loam, 5 to 10 percent slopes, eroded, 260 feet east and 20 feet south of the northwest corner of sec. 23, T. 28 N., R. 4 E.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak

medium subangular blocky structure parting to weak medium granular; friable; common very fine roots; fragments of yellowish brown (10YR 5/6) subsoil material in the lower part; slightly acid; abrupt smooth boundary.

Bt1—8 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium and fine subangular blocky structure; friable; common very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; very few distinct light gray (10YR 7/1) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium and fine subangular blocky structure; friable; common very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; very few distinct light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt3—27 to 40 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

2Bt4—40 to 50 inches; strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; few distinct brown (7.5YR 5/4) clay films on faces of peds; few medium accumulations of iron and manganese oxide; about 2 percent sandy glacial dolomite fragments of gravel size; neutral; abrupt smooth boundary.

2R—50 inches; hard, level-bedded dolomite bedrock; less than 4 inches of brownish yellow (10YR 6/6), fragmented dolomite in the upper part; brown (7.5YR 4/4), clayey residuum in the fissures.

The depth to dolomite limestone bedrock ranges from 40 to 60 inches. The thickness of the residuum ranges from 5 to 20 inches.

Pedons in uncultivated areas have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is silty clay loam or silt loam. The 2B horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 3 to 8. It is silty clay, clay, or silty clay loam. In some pedons it has limestone, chert, or glacial fragments of gravel and cobble size.

The Palsgrove soil in the map unit NewGlarus-Palsgrove silt loams, 7 to 15 percent slopes, eroded, is shallower to residuum than is definitive for the series. This difference, however, does not significantly affect the use and management of the soil. The soil is classified as a fine-silty over clayey, mixed, mesic Typic Hapludalf.

Raddle Series

The Raddle series consists of deep, moderately well drained, moderately permeable soils on stream terraces. These soils formed in silty alluvium. Slopes range from 1 to 4 percent.

Typical pedon of Raddle silt loam, 1 to 4 percent slopes, rarely flooded, 1,100 feet west and 220 feet north of the southeast corner of sec. 32, T. 27 N., R. 5 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure parting to moderate medium and fine granular; friable; few very fine roots; fragments of brown (10YR 4/3) material in the lower part; neutral; clear smooth boundary.

Bw1—10 to 19 inches; yellowish brown (10YR 5/4) silt loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bw2—19 to 29 inches; yellowish brown (10YR 5/4) silt loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium and fine subangular blocky; friable; few very fine roots; few faint brown (10YR 5/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bw3—29 to 35 inches; brown (10YR 5/3) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

BC—35 to 52 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films along root channels; few faint grayish brown (10YR 5/2) clay films on faces of peds; few fine accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

C—52 to 60 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine

accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 50 to 65 inches. The Bw horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 2 to 4.

Rozetta Series

The Rozetta series consists of deep, moderately well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 2 to 15 percent.

Typical pedon of Rozetta silt loam, 5 to 10 percent slopes, eroded, 1,620 feet east and 1,330 feet south of the northwest corner of sec. 3, T. 27 N., R. 2 E.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium and fine granular structure; friable; few very fine roots; fragments of yellowish brown (10YR 5/4) subsoil material in the lower part; neutral; clear smooth boundary.

Bt1—9 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

Bt2—20 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common very fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; few medium accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

Bt3—28 to 36 inches; brown (10YR 5/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and common fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; common medium accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

BC—36 to 46 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent strong brown (7.5YR 5/6) and many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

C—46 to 60 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent strong brown (7.5YR 5/6) and many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; common medium accumulations of iron and manganese oxide; slightly acid.

The thickness of the solum ranges from 38 to 50 inches. The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon, if it occurs, has value of 4 or 5 and chroma of 2 or 3. The Bt and C horizons are silt loam or silty clay loam. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 4 to 6 and chroma of 2 to 4.

Sable Series

The Sable series consists of deep, poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Typical pedon of Sable silty clay loam, 360 feet west and 940 feet south of the northeast corner of sec. 16, T. 28 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; common fine roots; neutral; clear smooth boundary.

A—9 to 15 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; common fine roots; neutral; gradual smooth boundary.

AB—15 to 22 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine and very fine subangular blocky structure; friable; common fine roots; common distinct black (10YR 2/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Btg1—22 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and very fine subangular blocky structure; friable; few fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common distinct black (10YR 2/1) and very dark gray (10YR 3/1) krotovinas and root channel fillings; neutral; gradual smooth boundary.

Btg2—31 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and very fine subangular blocky structure; friable; few fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common distinct black (10YR 2/1) and very dark gray (10YR 3/1) krotovinas and root

channel fillings; neutral; gradual smooth boundary.

Btg3—38 to 47 inches; light olive gray (5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common prominent dark gray (10YR 4/1) clay films on faces of peds; common prominent very dark gray (10YR 3/1) krotovinas and root channel fillings; neutral; gradual smooth boundary.

BCg—47 to 60 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few prominent dark gray 10YR 4/1) clay films on faces of peds; neutral.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 15 to 24 inches. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 5 or 6 and chroma of 0 to 2.

Schapville Series

The Schapville series consists of moderately deep, moderately well drained soils on uplands. These soils formed in loess and in the underlying material weathered from calcareous shale. Permeability is moderate in the upper part of the solum and very slow in the lower part. Slopes range from 2 to 15 percent.

Typical pedon of Schapville silt loam, 2 to 5 percent slopes, 860 feet south and 1,600 feet east of the northwest corner of sec. 21, T. 29 N., R. 3 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium platy structure parting to weak medium granular; friable; many roots; common root and worm channels filled with fragments of dark yellowish brown (10YR 4/4) subsoil material in the lower part; neutral; abrupt smooth boundary.

Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—16 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; many fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; common distinct brown (10YR 5/3) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt3—21 to 26 inches; brown (10YR 5/3) silty clay loam; few fine faint yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear wavy boundary.

2Bt4—26 to 30 inches; light yellowish brown (2.5Y 6/4) clay; many fine prominent greenish gray (5G 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure; very firm; few fine roots; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; neutral; gradual smooth boundary.

2Cr—30 to 60 inches; light gray (2.5Y 7/2) clay shale and yellow (10YR 7/8) dolomite bedrock; massive; very firm; strongly effervescent; moderately alkaline.

The depth to shale bedrock ranges from 25 to 40 inches. The thickness of the loess ranges from 20 to 30 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It ranges from 10 to 15 inches in thickness. The 2Bt horizon has value of 5 or 6 and chroma of 2 to 4.

Schapville silt loam, 5 to 10 percent slopes, eroded, and Schapville silt loam, 10 to 15 percent slopes, eroded, have a dark surface soil that is thinner than is definitive for the series. This difference, however, does not significantly affect the use and management of the soils. The soils are classified as fine, mixed, mesic Mollic Hapludalfs.

Seaton Series

The Seaton series consists of deep, well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 2 to 45 percent.

Typical pedon of Seaton silt loam, 10 to 15 percent slopes, eroded, 2,330 feet west and 840 feet north of the southeast corner of sec. 33, T. 26 N., R. 3 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/1) dry; moderate fine and medium granular structure; friable; many fine roots; fragments of brown (10YR 4/3) subsoil material; neutral; abrupt smooth boundary.

Bt1—7 to 13 inches; brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; many fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt2—13 to 19 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure parting to

moderate fine subangular blocky; friable; many fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bt3—19 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure parting to moderate medium subangular and angular blocky; friable; many fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt4—29 to 51 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; friable; many fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

BC—51 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable; common fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 45 to more than 60 inches. The A or Ap horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon, if it occurs, has value of 4 or 5 and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 2 to 4.

Shullsburg Series

The Shullsburg series consists of moderately deep, somewhat poorly drained, slowly permeable soils on uplands. These soils formed in loess and in the underlying material weathered from calcareous shale. Slopes range from 3 to 7 percent.

Typical pedon of Shullsburg silt loam, 3 to 7 percent slopes, 1,200 feet west and 640 feet south of the northeast corner of sec. 24, T. 29 N., R. 2 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate medium and fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

AB—7 to 13 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; few fine faint strong brown (7.5YR 5/6) mottles; moderate very fine subangular blocky structure; friable; common very fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bt1—13 to 19 inches; dark grayish brown (10YR 4/2) silty clay; few fine faint strong brown (7.5YR 5/6) and few medium faint pale yellow (5Y 6/3) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

2Bt2—19 to 24 inches; light olive gray (5Y 6/2) silty clay; common fine faint olive yellow (2.5Y 6/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; common distinct dark gray (5Y 4/1) clay films on faces of peds and along root channels; few fine accumulations of iron and manganese oxide; about 2 percent weathered shale fragments of gravel size; slightly effervescent; mildly alkaline; clear smooth boundary.

2Cr—24 to 60 inches; light gray (5Y 6/1) and greenish gray (5GY 6/1) silty clay shale; common medium prominent olive yellow (2.5Y 6/8) mottles; massive; very firm; few soft accumulations of lime; strongly effervescent; mildly alkaline.

The depth to shale bedrock ranges from 20 to 40 inches. The thickness of the loess ranges from 15 to 25 inches. The thickness of the mollic epipedon ranges from 12 to 18 inches.

The Bt horizon is silty clay loam or silty clay. The 2Bt horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2 to 4. The 2Cr horizon has hue of 2.5Y, 5Y, or 5GY, value of 5 or 6, and chroma of 1 to 4.

Sparta Series

The Sparta series consists of deep, excessively drained, rapidly permeable soils on stream terraces. These soils formed in sandy material. Slopes range from 1 to 15 percent.

Typical pedon of Sparta loamy sand, 1 to 7 percent slopes, 2,500 feet east and 1,300 feet north of the southwest corner of sec. 34, T. 26 N., R. 2 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) loamy sand, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; very friable; common very fine roots; slightly acid; clear smooth boundary.

AB—9 to 16 inches; very dark grayish brown (10YR

3/2) loamy sand, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; very friable; common very fine roots; slightly acid; clear smooth boundary.

Bw—16 to 36 inches; brown (10YR 4/3) sand; single grain; very friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

C—36 to 60 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; slightly acid.

The thickness of the solum ranges from 30 to 45 inches. The Ap, A, AB, and Bw horizons are loamy sand or sand. The Bw horizon has value and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 3 to 6.

Stronghurst Series

The Stronghurst series consists of deep, somewhat poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slopes range from 1 to 3 percent.

Typical pedon of Stronghurst silt loam, 1 to 3 percent slopes, 2,635 feet east and 1,640 feet north of the southwest corner of sec. 26, T. 29 N., R. 3 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure parting to moderate medium and fine granular; friable; few very fine roots; fragments of brown (10YR 5/3) subsoil material in the lower part; few distinct light gray (10YR 7/2) silt coatings on faces of peds; neutral; abrupt smooth boundary.

BE—8 to 11 inches; brown (10YR 5/3) silt loam; light brownish gray (10YR 6/2) exterior of peds; few fine faint yellowish brown (10YR 5/4) mottles; weak medium platy structure; very friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—11 to 14 inches; brown (10YR 5/3) silty clay loam; light brownish gray (10YR 6/2) exterior of peds; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—14 to 19 inches; brown (10YR 5/3) silty clay loam; light brownish gray (10YR 6/2) exterior of peds; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Btg1—19 to 26 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Btg2—26 to 38 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

BCg—38 to 43 inches; light brownish gray (10YR 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Cg—43 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; many fine accumulations of iron and manganese oxide; neutral.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. Some pedons have an E horizon. The E and B horizons have value of 5 or 6 and chroma of 2 or 3.

Tama Series

The Tama series consists of deep, moderately well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 2 to 10 percent.

Typical pedon of Tama silt loam, 2 to 5 percent slopes, 2,000 feet south and 1,340 feet east of the northwest corner of sec. 25, T. 29 N., R. 1 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam,

gray (10YR 5/1) dry; moderate medium and fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

BA—8 to 14 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to moderate medium and fine granular; friable; many fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure parting to moderate medium and fine granular; friable; many fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—19 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and fine subangular blocky structure; friable; many fine roots; distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct white (10YR 8/1 dry) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt3—27 to 33 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct white (10YR 8/1 dry) silt coatings on faces of peds; medium acid; clear smooth boundary.

BC—33 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to weak coarse angular and subangular blocky; friable; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common fine accumulations of iron and manganese oxide; medium acid; gradual smooth boundary.

C—41 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and many medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; few fine roots; few brown (10YR 4/3) clay films in worm channels; slightly acid.

The thickness of the solum ranges from 40 to 60 inches. The Ap or A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4.

Tell Series

The Tell series consists of deep, well drained soils on uplands and stream terraces. These soils formed in loess or silty material and in the underlying sandy material. Permeability is moderate in the solum and rapid in the underlying material. Slopes range from 2 to 10 percent.

Typical pedon of Tell silt loam, 2 to 5 percent slopes, 1,020 feet west and 1,900 feet south of the northeast corner of sec. 12, T. 28 N., R. 2 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 15 inches; brown (7.5YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few distinct white (10YR 8/1 dry) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—15 to 22 inches; brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; many fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few distinct white (10YR 8/1 dry) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt3—22 to 30 inches; brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; many fine roots; few distinct dark brown (7.5YR 4/4) clay films on faces of peds; few distinct white (10YR 8/1 dry) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

2BC—30 to 34 inches; brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; very friable; many fine roots; few distinct reddish brown (5YR 4/4) clay films on faces of peds; few fine accumulations of iron and manganese oxide; strongly acid; abrupt smooth boundary.

2C—34 to 60 inches; stratified dark yellowish brown (10YR 4/4) fine sand and brown (7.5YR 4/4) loamy sand; single grain; loose; few fine roots; strongly acid.

The depth to sandy material ranges from 22 to 36 inches. The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The BE horizon, if it occurs, has value of 4 or 5 and chroma of 3 or 4. The 2BC horizon has value and chroma of 3 or 4. It is fine sandy loam, sandy loam, or loam. The 2C horizon has value of 4 or 5 and chroma of 4 to 6. It is stratified fine sand, loamy sand, or sand.

Tice Series

The Tice series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Tice silt loam, occasionally flooded, 140 feet east and 900 feet south of the northwest corner of sec. 14, T. 28 N., R. 4 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium and fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

A—9 to 19 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; few very fine roots; few distinct grayish brown (2.5Y 5/2) silt coatings on faces of peds; neutral; clear smooth boundary.

Bw1—19 to 29 inches; brown (10YR 5/3) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) and common distinct dark grayish brown (10YR 4/2) coatings on faces of peds; noticeable clean silt grains when dry; neutral; clear smooth boundary.

Bw2—29 to 37 inches; brown (10YR 5/3) silty clay loam; few fine prominent reddish yellow (7.5YR 6/6) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct pale brown (10YR 6/3 dry) silt coatings on faces of peds; few fine accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

BC—37 to 44 inches; brown (10YR 5/3) silty clay loam; many fine distinct light brownish gray (2.5Y 6/2) and common fine prominent reddish yellow (7.5YR 6/6) mottles; weak medium prismatic structure; friable; few very fine roots; few fine accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

2C—44 to 60 inches; mottled brown (10YR 5/3), light brownish gray (2.5Y 6/2), and reddish yellow (7.5YR 6/6) silt loam; massive; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings along root channels; few fine accumulations of iron and manganese oxide; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the mollic epipedon ranges from 12 to 24 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silty clay loam or silt loam. The 2C or 2Cg horizon has value of 5 or 6 and chroma of 2 or 3.

Wakeland Series

The Wakeland series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Wakeland silt loam, frequently flooded, 680 feet north and 60 feet west of the southeast corner of sec. 27, T. 28 N., R. 1 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; few very fine roots; neutral; abrupt smooth boundary.

2C1—10 to 22 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent brown (7.5YR 4/4) and common fine faint brown (10YR 4/3) mottles; massive; friable; few very fine roots; few distinct light gray (10YR 7/2) depositional strata; neutral; clear smooth boundary.

2C2—22 to 33 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct brown (7.5YR 4/4) and many fine faint brown (10YR 4/3) mottles; massive; very friable; few very fine roots; few distinct light gray (10YR 7/2) depositional strata; few distinct dark grayish brown (10YR 4/2) coatings along root channels; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2C3—33 to 44 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct brown (7.5YR 4/4) mottles; massive; very friable; few very fine roots; few distinct light gray (10YR 7/2) depositional strata of fine sand; neutral; clear smooth boundary.

2Cg—44 to 51 inches; dark gray (10YR 4/1) silt loam; few fine distinct brown (7.5YR 4/4) mottles; massive; friable; few very fine roots; few fine accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

2Ab—51 to 60 inches; black (10YR 2/1) silt loam; moderate medium and fine granular structure; friable; neutral.

The Ap or A horizon has value of 3 or 4 and chroma of 1 or 2. The part of the 2C horizon within a depth of 30 inches has value of 4 to 6 and chroma of 1 to 3. The part below a depth of 30 inches has value of 4 to 6 and chroma of 1 to 4. Some pedons have thin strata of fine sand below a depth of 40 inches.

Zwingle Series

The Zwingle series consists of deep, poorly drained, very slowly permeable soils on stream terraces. These soils formed in clayey lacustrine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Zwingle silt loam, 1,620 feet east and 660 feet south of the northwest corner of sec. 36, T. 26 N., R. 2 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, gray (10YR 6/1) dry; weak fine granular structure; friable; common fine roots; few distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; abrupt smooth boundary.

E—8 to 11 inches; dark grayish brown (10YR 4/2) silt loam; weak thin platy structure parting to moderate medium granular; friable; common fine roots; few distinct light gray (10YR 7/2) silt coatings on faces of peds; slightly acid; abrupt smooth boundary.

2Btg1—11 to 18 inches; grayish brown (10YR 5/2) silty clay; common fine distinct yellowish brown (10YR 5/6) and common fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; many distinct light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

2Btg2—18 to 25 inches; grayish brown (2.5Y 5/2) clay; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; medium acid; abrupt smooth boundary.

2Bt—25 to 37 inches; reddish brown (5YR 5/4) silty clay; few fine prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure; firm; few fine roots; common distinct reddish brown (5YR 4/3) clay films on faces of peds; many fine accumulations of iron and manganese oxide; medium acid; abrupt smooth boundary.

2BC—37 to 41 inches; reddish brown (5YR 5/4) silty clay loam; few fine faint yellowish red (5YR 5/6) mottles; weak coarse prismatic structure parting to moderate coarse and medium subangular blocky; firm; few distinct reddish brown (5YR 4/4) clay films on faces of peds; common fine accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

2Cg1—41 to 47 inches; mottled light brownish gray (2.5Y 6/2), strong brown (7.5YR 5/6), and grayish brown (10YR 5/2) silty clay; massive; firm; neutral; abrupt smooth boundary.

3Cg2—47 to 60 inches; mottled, stratified light brownish gray (2.5Y 6/2) silt loam, yellowish brown (10YR 5/6) fine sandy loam, and reddish brown (5YR 4/4) silty clay loam and silty clay; massive; friable; neutral.

The Ap or A horizon has value of 3 or 4 and chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 or 2. The 2Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. The 2Bt horizon has value of 4 to 6 and chroma of 2 to 4. It is silty clay loam, silty clay, or clay. The Cg horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is dominantly silt loam or silty clay but has strata of fine sandy loam or silty clay loam.

Formation of the Soils

Kim Smail, soil scientist, Natural Resources Conservation Service, prepared this section.

Soils form in deposited or accumulated geologic material. The characteristics of the soils are determined by the physical and mineralogical composition of the parent material, the climate under which the soil material accumulated and has existed since accumulation, the plant and animal life on and in the soils, relief and drainage, and the length of time that the processes of soil formation have acted on the soil material *(6)*.

Climate and plant and animal life are the active factors of soil formation. They act on the parent material that has accumulated, slowly changing it into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and in extreme cases determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil. Some time is always required for the differentiation of soil horizons. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. The soils in Jo Daviess County formed in loess, alluvium, material weathered from bedrock, colluvium, eolian and water-worked material, lacustrine deposits, and glacial till. Many of the soils formed in a combination of one or more of these kinds of parent material.

Loess is silty material deposited by the wind. It covers most of the areas on uplands in the county. It is the youngest parent material in the uplands. It is 20 to 25 feet thick in the areas where it is thickest *(11)*. Fayette and Rozetta are the dominant soils that formed entirely in loess. They are on the bluffs along the Mississippi River and on the more stable broad ridgetops. In areas on narrow ridges and side slopes, the loess deposits are thinner. The soils in these areas formed in loess and in the underlying material weathered from bedrock.

The unconsolidated deposits throughout the county are underlain by three major levels of bedrock. At the highest level is Silurian-aged Alexandrian dolomitic limestone, which ranges from 60 to 100 feet in thickness *(12)*. This level is characterized by prominent, narrow ridges, such as the Terrapin Ridge near the town of Elizabeth. In the areas on ridges where the deposits of loess are relatively thin, the depth to bedrock ranges from 20 to 60 inches and the underlying material weathered from the bedrock has a high content of chert fragments. Palsgrove and NewGlarus are the dominant soils on these ridges. On steep and very steep side slopes, NewGlarus soils and bedrock outcrops dominate. Near the points of side slopes and in areas below NewGlarus soils, the bedrock is covered by colluvium, which is material that formed through the freezing, thawing, and physical weathering of limestone bedrock and was moved downslope by gravity. The colluvium is as much as several feet thick. Lacrescent and Lamoille are the dominant soils in these areas. They formed in less than 20 inches of loess and in the underlying colluvium, which overlies calcareous shale in some areas.

Ordivician-aged Maquoketa shale is at the second level. It ranges from 130 to 180 feet in thickness. The landscape in areas of this shale is dissected by many narrow drainageways. Derinda and Eleroy are the major soils in these areas. They formed in less than 50 inches of loess and in the underlying material weathered from this shale.

The third level of bedrock is at the lowest level on the landscape. It consists of Ordivician-aged Galena-Platteville dolomitic limestone. This limestone does not have the chert fragments common in the Silurian-aged bedrock. Dubuque and Dunbarton are the dominant soils on the side slopes and narrow ridges in areas of the Galena-Platteville dolomitic limestone. These soils

formed in less than 40 inches of loess and in the underlying material weathered from this limestone. On the very steep side slopes, Lacrescent soils and bedrock outcrops are dominant.

The alluvial material in Jo Daviess County is Cohia alluvium, which was deposited by the floodwater of present streams and rivers in recent time. The flood plains in the county generally consist of silty alluvium. Birds and Wakeland are the dominant soils on the lower flood plains along the Mississippi River. Orion, Beaucoup, Dorchester, Huntsville, and Lawson are the dominant soils along the smaller rivers and creeks in the county. Beavercreek soils, which are loamy-skeletal, formed in a combination of alluvial and colluvial material along small creeks and upland drainageways. They typically are directly adjacent to water channels.

Sandy material is on terraces along the Mississippi River. The wind picked up sandy eolian material and deposited it a short distance from its source. This material is in areas on dunes on the terraces and bluffs along the Mississippi River. Chelsea and Bloomfield are the dominant soils in these areas. Water-worked sandy material has been moved from one place to another by water action. They are on broad flats on the terraces. Sparta and Dickinson are the dominant soils on the flats.

Lacustrine material was deposited from still, or ponded, glacial meltwater. The coarser fragments dropped out of moving water as outwash. As a result, only the finer particles, such as very fine sand, silt, and clay, remained to settle out in still water. Lacustrine deposits are silty or clayey. The lacustrine soils in the county are on terraces along the Mississippi River and its tributaries. They are farther from the river than the sandy material. Medary, Zwingle, and Niota are the dominant lacustrine soils.

Illinoian-aged glacial till was deposited in the eastern part of the county. The layer of till is relatively thin because the county was the western extreme of the Illinoian glacial advance. Glacial till is material laid down by glaciers with a minimum of water action. Miami soils formed in a thin mantle of loess and in the underlying till. Elco and Flagg soils formed in about 20 to 40 inches of loess and in the underlying paleosol (Sangamon soil), which formed in glacial deposits.

Climate

The humid, temperate, continental climate in Jo Daviess County has determined the kind of plant and animal life on and in the soils. It has determined the amount of water available for the weathering and translocation of soil material. Through its influence on soil temperature, climate affects chemical reactions in the soils and physical weathering of the parent material.

Plant and Animal Life

The vegetation that grew in the survey area prior to the time of settlement helped to differentiate the soils in Jo Daviess County, especially through the accumulation of organic matter, which influences the color of the surface soil. Dark soils formed under native prairie grasses. Tama and Muscatine soils are examples. Light colored soils formed in areas that supported trees, dominantly oak and hickory, for long periods. Fayette and Dubuque soils are examples. Some soils formed under mixed grasses and trees or were forested for a relatively short period before they were cleared. Downs and Massbach soils are examples. These soils have a moderately dark surface soil and have a moderate content of organic matter. Trees were the dominant native plants in the county.

Plant roots provide channels for the downward movement of water through the soil, which aids in the development of soil structure and soil horizons. The roots also bring up nutrients from the lower layers to the upper layers, increasing the level of fertility.

Animals that live in the soil, such as earthworms, mix the soil material and the organic matter. Bacteria in the soil break down the organic matter and release plant nutrients.

Human activities, such as clearing forests, cultivating, applying fertilizer, draining, irrigating, and excavating and filling, have affected soil formation in the county. These activities have been so recent, however, that their effects on soil formation are not yet readily apparent. Over time the influence of these activities will become more significant.

Relief and Drainage

Relief influences water infiltration and percolation, runoff, and erosion. The moisture status of most soils in a given climate is controlled mainly by relief and drainage.

Slopes range from 0 to 50 percent in Jo Daviess County. In areas where the soils formed in uniform, permeable, medium textured material, such as loess, natural drainage is closely related to the slope. Well drained and moderately well drained soils are in sloping areas, and somewhat poorly drained or poorly drained soils generally are in nearly level areas or in depressions. In areas of very permeable, sandy parent material, well drained soils may occur on all slopes, including nearly level areas, unless the soils have a

permanent high water table. Conversely, poorly drained and somewhat poorly drained soils may occur in sloping areas of slowly permeable parent material, such as shale residuum, which has a high content of clay.

Through its effect on aeration of the soil, natural drainage determines the color of the subsoil. In areas of Sable and other poorly drained soils that have a water table close to the surface, the soil pores contain water, which restricts the circulation of air in the soils. Under these conditions, naturally occurring iron and manganese compounds are chemically reduced. As a result, the subsoil is gray and mottled. In areas of Fayette and other well drained soils that have a water table at a depth of more than 60 inches, the soil pores contain less water and more air than the pores in the poorly drained soils. The iron and manganese compounds are well oxidized. As a result, the subsoil is brown and brightly colored.

On the steeper slopes rainfall tends to run off the surface instead of passing through the soils. The runoff and the removal of soil material on these slopes result in the formation of soils that have a thin solum and weakly expressed horizons.

Soils in nearly level areas accumulate water from the adjacent slopes. The accumulation of water results in more rapid leaching of the more soluble compounds and thus in more profile development.

Time

The length of time required for the formation of a soil depends on the other factors of soil formation. In areas where the parent material is low in content of lime, the soils form more rapidly and become acid more readily than the soils that form in material that is high in content of lime. The more rapidly permeable soils are leached of lime and other soluble minerals more quickly than the more slowly permeable soils. Soils form more quickly under forest vegetation than under prairie vegetation because grasses recycle bases from the subsoil to the surface layer more efficiently than trees. Soils generally form more quickly under a humid climate than under a dry climate. Also, they generally have strongly expressed horizons if they have been exposed to weathering for a long period. Clay gradually moves downward through the soils and accumulates in the subsoil over a long period.

The upland soils in which the solum formed in loess are more strongly developed than the soils that formed in sandy windblown material. The sandy material weathers more slowly than the loess. As a result, the sandy soils remain youthful over time. The alluvial soils along streams and rivers annually receive new sedimentary material. Thus, they are relatively young soils that show little evidence of horizon differentiation.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to

soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow.

Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a

stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the

soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Paleosol. A buried soil or formerly buried soil, especially one that formed during an interglacial period and was covered by deposits of subsequent glaciers.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability,

the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil

that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Underlying material. The part of the soil below the solum.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1961-90 at Stockton, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	25.7	8.8	17.2	50	-22	0	1.26	0.48	1.92	3	8.2
February----	31.0	13.7	22.3	56	-16	0	1.27	.46	1.94	3	6.9
March-------	43.1	25.5	34.3	75	-1	14	2.48	1.25	3.55	5	5.6
April-------	58.5	37.1	47.8	84	16	82	3.37	2.15	4.47	7	1.9
May---------	70.4	47.8	59.1	89	29	300	3.56	1.92	5.01	7	.0
June--------	79.4	57.3	68.3	94	41	550	4.05	2.02	5.81	6	.0
July--------	82.9	61.7	72.3	96	46	688	3.49	2.07	4.77	6	.0
August------	80.4	59.5	70.0	94	43	611	4.32	2.06	6.27	6	.0
September---	72.6	51.3	61.9	90	32	351	4.07	1.45	6.24	6	.0
October-----	61.1	40.3	50.7	83	20	132	2.80	1.42	4.19	5	.2
November----	45.2	28.8	37.0	69	5	15	2.55	1.29	3.65	5	1.9
December----	30.4	14.9	22.6	57	-15	0	1.82	.83	2.67	4	7.9
Yearly:											
Average---	56.7	37.2	47.0	---	---	---	---	---	---	---	---
Extreme---	---	---	---	97	-23	---	---	---	---	---	---
Total-----	---	---	---	---	---	2,742	35.04	28.21	40.87	63	32.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1961-90 at Stockton, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 17	May 1	May 15
2 years in 10 later than--	Apr. 13	Apr. 26	May 11
5 years in 10 later than--	Apr. 6	Apr. 17	May 2
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 13	Sept. 29	Sept. 22
2 years in 10 earlier than--	Oct. 19	Oct. 6	Sept. 27
5 years in 10 earlier than--	Oct. 29	Oct. 18	Oct. 6

TABLE 3.--GROWING SEASON

(Recorded in the period 1961-90 at Stockton, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	175	157	132
8 years in 10	181	164	140
5 years in 10	194	179	155
2 years in 10	208	193	171
1 year in 10	214	200	179

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
27D2	Miami silt loam, 10 to 15 percent slopes, eroded	985	0.2
29C2	Dubuque silt loam, 4 to 10 percent slopes, eroded	3,810	1.0
29D2	Dubuque silt loam, 10 to 15 percent slopes, eroded	7,220	1.8
36B	Tama silt loam, 2 to 5 percent slopes	10,795	2.7
36C	Tama silt loam, 5 to 10 percent slopes	685	0.2
41B	Muscatine silt loam, 1 to 3 percent slopes	6,305	1.6
53D	Bloomfield loamy fine sand, 7 to 15 percent slopes	715	0.2
61B	Atterberry silt loam, 1 to 3 percent slopes	3,040	0.8
68	Sable silty clay loam	965	0.2
87A	Dickinson fine sandy loam, 0 to 3 percent slopes	430	0.1
88B	Sparta loamy sand, 1 to 7 percent slopes	4,945	1.2
88D	Sparta loamy sand, 7 to 15 percent slopes	235	0.1
119C2	Elco silt loam, 5 to 10 percent slopes, eroded	2,785	0.7
172	Hoopeston loam	395	0.1
175B	Lamont fine sandy loam, 1 to 7 percent slopes	515	0.1
175D2	Lamont fine sandy loam, 7 to 15 percent slopes, eroded	695	0.2
261	Niota silt loam	555	0.1
274B2	Seaton silt loam, 2 to 5 percent slopes, eroded	505	0.1
274C2	Seaton silt loam, 5 to 10 percent slopes, eroded	3,050	0.8
274D2	Seaton silt loam, 10 to 15 percent slopes, eroded	3,505	0.9
274E2	Seaton silt loam, 15 to 25 percent slopes, eroded	3,350	0.8
274F	Seaton silt loam, 25 to 45 percent slopes	6,330	1.6
278B	Stronghurst silt loam, 1 to 3 percent slopes	1,040	0.3
279B	Rozetta silt loam, 2 to 5 percent slopes	12,090	3.1
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	15,510	3.9
279D2	Rozetta silt loam, 10 to 15 percent slopes, eroded	6,190	1.6
280B2	Fayette silt loam, 2 to 5 percent slopes, eroded	6,285	1.6
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	23,385	5.9
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded	17,905	4.5
280E2	Fayette silt loam, 15 to 25 percent slopes, eroded	9,150	2.3
280F	Fayette silt loam, 25 to 40 percent slopes	4,095	1.0
386B	Downs silt loam, 2 to 5 percent slopes	11,700	3.0
386C2	Downs silt loam, 5 to 10 percent slopes, eroded	8,625	2.2
403D	Elizabeth silt loam, 7 to 15 percent slopes	2,740	0.7
417B	Derinda silt loam, 2 to 5 percent slopes	380	0.1
417C2	Derinda silt loam, 5 to 10 percent slopes, eroded	2,365	0.6
417D2	Derinda silt loam, 10 to 15 percent slopes, eroded	5,515	1.4
417E2	Derinda silt loam, 15 to 25 percent slopes, eroded	5,710	1.4
417F	Derinda silt loam, 25 to 45 percent slopes	1,490	0.4
418B	Schapville silt loam, 2 to 5 percent slopes	300	0.1
418C2	Schapville silt loam, 5 to 10 percent slopes, eroded	1,475	0.4
418D2	Schapville silt loam, 10 to 15 percent slopes, eroded	1,560	0.4
419B2	Flagg silt loam, 2 to 5 percent slopes, eroded	550	0.1
419C2	Flagg silt loam, 5 to 10 percent slopes, eroded	805	0.2
429B2	Palsgrove silt loam, 2 to 5 percent slopes, eroded	1,580	0.4
429C2	Palsgrove silt loam, 5 to 10 percent slopes, eroded	9,695	2.4
429D2	Palsgrove silt loam, 10 to 15 percent slopes, eroded	8,620	2.2
429E2	Palsgrove silt loam, 15 to 25 percent slopes, eroded	1,800	0.5
536	Dumps, mine	385	0.1
540C2	Frankville silt loam, 4 to 10 percent slopes, eroded	640	0.2
547C2	Eleroy silt loam, 5 to 10 percent slopes, eroded	5,555	1.4
547D2	Eleroy silt loam, 10 to 15 percent slopes, eroded	10,010	2.5
547E2	Eleroy silt loam, 15 to 25 percent slopes, eroded	1,385	0.3
565B	Tell silt loam, 2 to 5 percent slopes	455	0.1
565C2	Tell silt loam, 5 to 10 percent slopes, eroded	370	0.1
569C2	Medary silty clay loam, 3 to 12 percent slopes, eroded	820	0.2
569F2	Medary silty clay loam, 15 to 45 percent slopes, eroded	825	0.2
572B	Loran silty clay loam, 3 to 7 percent slopes	1,285	0.3
576	Zwingle silt loam	1,020	0.3
681E	Dubuque-Orthents-Fayette complex, 12 to 25 percent slopes, pitted	395	0.1
731B	Nasset silt loam, 2 to 5 percent slopes	640	0.2
731C2	Nasset silt loam, 5 to 10 percent slopes, eroded	2,760	0.7
731D2	Nasset silt loam, 10 to 15 percent slopes, eroded	305	0.1
732B	Appleriver silt loam, 2 to 5 percent slopes	1,090	0.3

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
745B	Shullsburg silt loam, 3 to 7 percent slopes	690	0.2
753B	Massbach silt loam, 2 to 5 percent slopes	1,150	0.3
753C2	Massbach silt loam, 5 to 10 percent slopes, eroded	4,775	1.2
753D2	Massbach silt loam, 10 to 15 percent slopes, eroded	985	0.2
755F2	Lamoille silt loam, 15 to 30 percent slopes, eroded	3,870	1.0
779F	Chelsea loamy fine sand, 20 to 45 percent slopes	1,660	0.4
785F	Lacrescent silt loam, 15 to 30 percent slopes	9,745	2.5
785G	Lacrescent silty clay loam, 30 to 50 percent slopes	19,265	4.9
800	Psamments, nearly level	105	*
801B	Orthents, silty, undulating	320	0.1
864	Pits, quarries	265	0.1
873D2	Dunbarton-Dubuque silt loams, 7 to 15 percent slopes, eroded	11,500	2.9
873E2	Dunbarton-Dubuque silt loams, 15 to 25 percent slopes, eroded	12,395	3.1
905F	NewGlarus-Lamoille silt loams, 15 to 35 percent slopes,	15,000	3.8
928D2	NewGlarus-Palsgrove silt loams, 7 to 15 percent slopes, eroded	11,550	2.9
1334	Birds silt loam, wet	4,790	1.2
3077	Huntsville silt loam, frequently flooded	1,280	0.3
3333	Wakeland silt loam, frequently flooded	6,220	1.6
3451	Lawson silt loam, frequently flooded	4,440	1.1
3579	Beavercreek silt loam, frequently flooded	8,550	2.2
7430B	Raddle silt loam, 1 to 4 percent slopes, rarely flooded	2,180	0.6
8070	Beaucoup silty clay loam, occasionally flooded	2,515	0.6
8239	Dorchester silt loam, occasionally flooded	4,220	1.0
8284	Tice silt loam, occasionally flooded	2,290	0.6
8366	Algansee fine sandy loam, occasionally flooded	440	0.1
8415	Orion silt loam, occasionally flooded	4,590	1.1
	Water	10,880	2.7
	Total	395,985	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
36B	Tama silt loam, 2 to 5 percent slopes
41B	Muscatine silt loam, 1 to 3 percent slopes
61B	Atterberry silt loam, 1 to 3 percent slopes
68	Sable silty clay loam (where drained)
87A	Dickinson fine sandy loam, 0 to 3 percent slopes
172	Hoopeston loam
175B	Lamont fine sandy loam, 1 to 7 percent slopes
261	Niota silt loam (where drained)
274B2	Seaton silt loam, 2 to 5 percent slopes, eroded
278B	Stronghurst silt loam, 1 to 3 percent slopes
279B	Rozetta silt loam, 2 to 5 percent slopes
280B2	Fayette silt loam, 2 to 5 percent slopes, eroded
386B	Downs silt loam, 2 to 5 percent slopes
419B2	Flagg silt loam, 2 to 5 percent slopes, eroded
429B2	Palsgrove silt loam, 2 to 5 percent slopes, eroded
565B	Tell silt loam, 2 to 5 percent slopes
572B	Loran silty clay loam, 3 to 7 percent slopes
731B	Nasset silt loam, 2 to 5 percent slopes
732B	Appleriver silt loam, 2 to 5 percent slopes
745B	Shullsburg silt loam, 3 to 7 percent slopes
753B	Massbach silt loam, 2 to 5 percent slopes
3077	Huntsville silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3333	Wakeland silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3451	Lawson silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3579	Beavercreek silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
7430B	Raddle silt loam, 1 to 4 percent slopes, rarely flooded
8070	Beaucoup silty clay loam, occasionally flooded (where drained)
8239	Dorchester silt loam, occasionally flooded
8284	Tice silt loam, occasionally flooded
8415	Orion silt loam, occasionally flooded

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Timothy-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
27D2 Miami	IVe	109	36	46	61	4.3	7.2
29C2 Dubuque	IIIe	78	23	34	50	3.2	5.3
29D2 Dubuque	IIIe	75	22	32	48	3.1	5.1
36B Tama	IIe	153	46	61	88	5.9	9.7
36C Tama	IIIe	150	45	60	85	5.7	9.5
41B Muscatine	IIe	165	50	63	94	6.1	10.2
53D Bloomfield	IVe	73	29	38	47	3.0	5.0
61B Atterberry	IIe	148	44	59	84	5.6	9.2
68 Sable	IIw	156	51	61	85	5.6	9.3
87A Dickinson	IIIs	99	37	45	77	3.9	6.5
88B Sparta	IVs	82	28	36	51	3.2	5.3
88D Sparta	VIs	---	---	---	---	3.1	5.1
119C2 Elco	IIIe	105	35	44	60	4.1	6.9
172 Hoopeston	I	117	38	52	75	4.7	7.7
175B Lamont	IIIe	94	35	44	75	3.6	6.0
175D2 Lamont	IVe	87	32	41	69	3.3	5.4
261 Niota	IIIw	86	30	39	53	3.3	5.5
274B2 Seaton	IIe	116	35	49	67	4.8	7.4
274C2 Seaton	IIIe	111	33	46	65	4.5	7.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Timothy-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
274D2----------- Seaton	IIIe	106	32	44	62	4.3	7.2
274E2----------- Seaton	VIe	---	---	---	---	3.7	6.2
274F------------ Seaton	VIIe	---	---	---	---	2.7	4.6
278B------------ Stronghurst	IIe	137	42	54	75	5.3	8.8
279B------------ Rozetta	IIe	130	40	53	72	5.2	8.6
279C2----------- Rozetta	IIIe	123	38	51	69	4.9	8.2
279D2----------- Rozetta	IIIe	110	34	45	61	4.4	7.3
280B2----------- Fayette	IIe	145	49	---	87	---	10.2
280C2----------- Fayette	IIIe	121	37	50	69	4.9	8.2
280D2----------- Fayette	IIIe	116	35	48	66	4.7	7.8
280E2----------- Fayette	VIe	---	---	---	---	4.4	7.3
280F------------ Fayette	VIIe	---	---	---	---	3.0	4.9
386B------------ Downs	IIe	147	43	58	82	5.6	9.2
386C2----------- Downs	IIIe	149	50	---	89	5.3	8.8
403D------------ Elizabeth	VIs	---	---	---	---	---	3.3
417B------------ Derinda	IIe	81	28	35	50	3.2	5.3
417C2----------- Derinda	IIIe	74	25	32	46	2.9	4.9
417D2----------- Derinda	IVe	70	24	30	43	2.8	4.6
417E2, 417F----- Derinda	VIIe	---	---	---	---	2.1	3.4
418B------------ Schapville	IIe	87	33	39	54	3.6	5.9

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Timothy-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
418C2----------- Schapville	IIIe	80	30	35	50	3.3	5.5
418D2----------- Schapville	IVe	76	28	34	47	3.1	5.2
419B2----------- Flagg	IIe	120	39	51	71	4.8	7.9
419C2----------- Flagg	IIIe	114	37	49	68	4.5	7.5
429B2----------- Palsgrove	IIe	106	36	47	62	4.5	7.4
429C2----------- Palsgrove	IIIe	102	34	44	59	4.2	7.1
429D2----------- Palsgrove	IIIe	91	30	39	53	3.8	6.3
429E2----------- Palsgrove	VIe	---	---	---	---	3.5	5.8
536**. Dumps							
540C2----------- Frankville	IIIe	84	25	36	54	3.4	5.6
547C2----------- Eleroy	IIIe	95	33	42	63	4.1	6.7
547D2----------- Eleroy	IIIe	91	32	41	60	3.9	6.5
547E2----------- Eleroy	VIe	---	---	---	---	3.3	5.5
565B------------ Tell	IIe	101	35	45	59	4.0	6.6
565C2----------- Tell	IIIe	96	33	42	56	3.8	6.3
569C2----------- Medary	IIIe	90	29	---	60	---	---
569F2----------- Medary	VIIe	---	---	---	---	2.3	3.8
572B------------ Loran	IIe	116	38	48	66	4.6	7.6
576------------- Zwingle	IIIw	92	33	41	58	3.7	6.2
681E**---------- Dubuque-Orthents-Fayette	VIe	---	---	---	---	2.0	4.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Timothy-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
731B------------ Nasset	IIe	111	37	48	66	4.5	7.4
731C2----------- Nasset	IIIe	105	35	45	63	4.2	7.1
731D2----------- Nasset	IIIe	101	33	43	60	4.1	6.8
732B------------ Appleriver	IIe	105	37	48	69	4.4	7.6
745B------------ Shullsburg	IIe	106	38	45	62	3.9	6.6
753B------------ Massbach	IIe	105	35	46	69	4.4	7.3
753C2----------- Massbach	IIIe	100	33	43	66	4.1	6.9
753D2----------- Massbach	IIIe	95	32	41	63	4.0	6.6
755F2----------- Lamoille	VIe	---	---	---	---	3.0	4.5
779F------------ Chelsea	VIIs	---	---	---	---	1.5	2.5
785F------------ Lacrescent	VIe	---	---	---	---	---	6.0
785G------------ Lacrescent	VIIe	---	---	---	---	---	3.9
800. Psamments							
801B. Orthents							
864**. Pits							
873D2**--------- Dunbarton-Dubuque	IVe	70	22	30	41	3.0	4.9
873E2**--------- Dunbarton-Dubuque	VIIe	---	---	---	---	2.6	4.2
905F**---------- NewGlarus-Lamoille	VIe	---	---	---	---	2.8	4.3
928D2**--------- NewGlarus-Palsgrove	IIIe	85	30	40	55	3.7	6.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Timothy-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
1334------------ Birds	Vw	---	---	---	---	---	---
3077------------ Huntsville	IIw	152	48	64	86	5.8	9.7
3333------------ Wakeland	IIIw	135	45	57	74	5.2	8.7
3451------------ Lawson	IIIw	161	48	62	86	5.7	9.6
3579------------ Beavercreek	VIs	---	---	---	---	4.5	7.5
7430B----------- Raddle	IIe	148	45	58	82	5.8	9.6
8070------------ Beaucoup	IIw	138	46	55	75	5.1	8.5
8239------------ Dorchester	IIw	132	43	54	76	5.3	8.8
8284------------ Tice	IIw	153	47	61	84	5.7	9.5
8366------------ Algansee	IIIw	75	28	36	50	3.2	5.0
8415------------ Orion	IIw	161	48	62	86	5.7	9.6

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
53D------------- Bloomfield	4S	Slight	Slight	Moderate	Slight	Black oak-----------	70	4	Eastern white pine, Scotch pine, red pine, eastern redcedar, jack pine.
						White oak-----------	---	---	
						Scarlet oak---------	---	---	
						Shagbark hickory----	---	---	
274E2----------- Seaton	6R	Moderate	Moderate	Moderate	Slight	Yellow-poplar-------	90	6	White oak, northern red oak, black walnut, green ash, red pine, sugar maple.
						White oak-----------	90	5	
						Northern red oak----	80	4	
						Black walnut--------	---	---	
274F------------ Seaton	6R	Severe	Severe	Severe	Slight	Yellow-poplar-------	90	6	White oak, northern red oak, black walnut, green ash, red pine, sugar maple.
						White oak-----------	90	5	
						Northern red oak----	80	4	
						Black walnut--------	---	---	
280F------------ Fayette	4R	Moderate	Moderate	Slight	Slight	White oak-----------	80	4	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
403D------------ Elizabeth	3D	Slight	Severe	Severe	Severe	Black oak-----------	60	3	Eastern redcedar, eastern white pine, red pine, jack pine.
						Bur oak-------------	60	3	
						Eastern redcedar----	---	---	
						Shagbark hickory----	---	---	
						Northern red oak----	---	---	
417F------------ Derinda	4R	Severe	Severe	Slight	Slight	White oak-----------	70	4	Eastern white pine, red pine, eastern redcedar.
						Northern red oak----	70	4	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
429E2----------- Palsgrove	4R	Moderate	Moderate	Moderate	Slight	White oak-----------	70	4	Eastern white pine, Scotch pine, eastern redcedar, red pine.
						Northern red oak----	70	4	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
547E2----------- Eleroy	4R	Moderate	Moderate	Moderate	Slight	White oak-----------	70	4	White oak, northern red oak, black walnut, white ash, eastern white pine, red pine.
						Northern red oak----	---	---	
						Bur oak-------------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
569F2----------- Medary	4R	Severe	Severe	Severe	Severe	Northern red oak----	65	4	Eastern white pine, red pine, white spruce.
						Silver maple--------	---	---	
						American basswood---	---	---	
681E**:									
Dubuque--------	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, black walnut.
						White oak-----------	65	3	
Orthents.									
Fayette--------	4R	Moderate	Moderate	Slight	Slight	White oak-----------	80	4	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
755F2----------- Lamoille	3R	Moderate	Moderate	Moderate	Moderate	Northern red oak----	55	3	Northern red oak, white oak, American basswood, eastern white pine.
						American basswood---	55	2	
						Green ash-----------	52	2	
						White oak-----------	52	2	
						Shagbark hickory----	50	---	
						Sugar maple---------	50	2	
779F------------ Chelsea	3R	Moderate	Severe	Moderate	Slight	White oak-----------	55	3	Eastern white pine, Scotch pine, European larch, eastern redcedar, red pine, jack pine.
785F------------ Lacrescent	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	59	3	Eastern white pine, white oak, American basswood, northern red oak, red pine.
						White oak-----------	55	3	
						American basswood---	62	4	
785G------------ Lacrescent	3R	Severe	Severe	Slight	Slight	Northern red oak----	59	3	Eastern white pine, white oak, American basswood, northern red oak, red pine.
						White oak-----------	55	3	
						American basswood---	62	4	
873E2**:									
Dunbarton------	4R	Moderate	Moderate	Moderate	Severe	Northern red oak----	61	4	Eastern white pine, jack pine, eastern redcedar, red pine.
						Black oak-----------	---	---	
						White oak-----------	---	---	
						Shagbark hickory----	---	---	
Dubuque--------	3R	Moderate	Moderate	Slight	Moderate	Northern red oak----	65	3	Eastern white pine, red pine, black walnut.
						White oak-----------	65	3	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
905F**:									
NewGlarus------	4R	Moderate	Moderate	Slight	Moderate	Northern red oak----	80	4	Eastern white pine, black walnut, yellow-poplar.
						Yellow-poplar-------	88	6	
						Green ash-----------	---	---	
						White ash-----------	---	---	
						Black walnut--------	---	---	
Lamoille-------	3R	Moderate	Moderate	Moderate	Moderate	Northern red oak----	55	3	Northern red oak, white oak, American basswood, eastern white pine.
						American basswood---	55	2	
						Green ash-----------	52	2	
						White oak-----------	52	2	
						Shagbark hickory----	50	---	
						Sugar maple---------	50	2	
1334------------ Birds	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	5	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
						Eastern cottonwood--	100	9	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3333------------ Wakeland	5A	Slight	Slight	Slight	Slight	Pin oak-------------	90	5	Eastern white pine, baldcypress, American sycamore, red maple, white ash.
						Sweetgum------------	88	7	
						Yellow-poplar-------	90	6	
						Virginia pine-------	85	9	
3579------------ Beavercreek	3F	Slight	Moderate	Slight	Slight	Northern red oak----	55	3	Northern red oak, white oak, eastern white pine, butternut, black walnut.
						White oak-----------	55	3	
						Eastern white pine--	50	6	
						Butternut-----------	55	---	
						Black walnut--------	55	---	
8366------------ Algansee	4S	Slight	Slight	Moderate	Slight	Quaking aspen-------	55	4	American sycamore, eastern cottonwood, quaking aspen.
						Silver maple--------	76	2	
						Pin oak-------------	80	4	
						American sycamore---	80	---	
						Hackberry-----------	35	---	
						Red maple-----------	51	2	
						Eastern cottonwood--	90	7	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
27D2 Miami	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
29C2, 29D2 Dubuque	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
36B, 36C Tama	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
41B Muscatine	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
53D Bloomfield	Radiant crabapple, eastern redcedar, autumn-olive, Washington hawthorn, Amur honeysuckle, lilac.	Austrian pine, jack pine, red pine.	Eastern white pine	---
61B Atterberry	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
68 Sable	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
87A Dickinson	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
88B, 88D Sparta	Amur honeysuckle, lilac, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Red pine, jack pine, Austrian pine.	Eastern white pine	---
119C2 Elco	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
172. Hoopeston	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
175B, 175D2. Lamont	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---
261. Niota	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
274B2, 274C2, 274D2, 274E2, 274F. Seaton	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
278B. Stronghurst	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
279B, 279C2, 279D2. Rozetta	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B2, 280C2, 280D2, 280E2, 280F. Fayette	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
386B. Downs	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern whitecedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
386C2. Downs	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
403D. Elizabeth				

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
417B, 417C2, 417D2, 417E2, 417F------------- Derinda	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, silky dogwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
418B, 418C2, 418D2------------ Schapville	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, silky dogwood, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
419B2, 419C2------ Flagg	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
429B2, 429C2, 429D2, 429E2----- Palsgrove	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
536*. Dumps				
540C2------------- Frankville	Eastern redcedar, Siberian peashrub.	Hackberry, eastern white pine, Manchurian crabapple, Russian-olive, green ash.	Honeylocust, Siberian elm.	---
547C2, 547D2, 547E2------------ Eleroy	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
565B, 565C2------- Tell	Lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Eastern white pine, jack pine, red pine, Austrian pine.	---	---
569C2, 569F2------ Medary	Gray dogwood, American cranberrybush, lilac, Amur maple, northern whitecedar, alternateleaf dogwood, silky dogwood.	White spruce----------	Red pine, eastern white pine, white ash, red maple.	---

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
572B. Loran	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
576. Zwingle	American cranberrybush, Amur privet, silky dogwood, Amur honeysuckle.	Washington hawthorn, blue spruce, white fir, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
681E*:				
Dubuque	Amur honeysuckle, lilac, autumn-olive, eastern redcedar, radiant crabapple, Washington hawthorn.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
Orthents.				
Fayette	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
731B, 731C2, 731D2. Nasset	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
732B. Appleriver	Silky dogwood, American cranberrybush, redosier dogwood.	Northern whitecedar, eastern redcedar.	Eastern white pine, Norway spruce.	---
745B. Shullsburg	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
753B, 753C2, 753D2. Massbach	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
755F2. Lamoille				
779F. Chelsea	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Austrian pine, jack pine, red pine.	Eastern white pine	---
785F, 785G. Lacrescent				
800. Psamments				

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
801B. Orthents				
864*. Pits				
873D2*, 873E2*: Dunbarton.				
Dubuque----------	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
905F*: NewGlarus--------	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
Lamoille.				
928D2*: NewGlarus--------	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
Palsgrove--------	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
1334-------------- Birds	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
3077-------------- Huntsville	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3333-------------- Wakeland	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3451-------------- Lawson	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
3579. Beavercreek				

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
7430B------------- Raddle	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
8070-------------- Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
8239-------------- Dorchester	Siberian peashrub-----	Green ash, Osage-orange, eastern redcedar, northern whitecedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow, golden willow.	Eastern cottonwood.
8284-------------- Tice	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
8366-------------- Algansee	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
8415-------------- Orion	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27D2 Miami	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
29C2 Dubuque	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: depth to rock.
29D2 Dubuque	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope, depth to rock.
36B Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
36C Tama	Slight	Slight	Severe: slope.	Slight	Slight.
41B Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
53D Bloomfield	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
61B Atterberry	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
68 Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
87A Dickinson	Slight	Slight	Slight	Slight	Slight.
88B Sparta	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
88D Sparta	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
119C2 Elco	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
172 Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
175B Lamont	Slight	Slight	Moderate: slope.	Slight	Slight.
175D2 Lamont	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
261 Niota	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
274B2 Seaton	Slight	Slight	Moderate: slope.	Slight	Slight.
274C2 Seaton	Slight	Slight	Severe: slope.	Slight	Slight.
274D2 Seaton	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
274E2 Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
274F Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
278B Stronghurst	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
279B Rozetta	Slight	Slight	Moderate: slope.	Slight	Slight.
279C2 Rozetta	Slight	Slight	Severe: slope.	Slight	Slight.
279D2 Rozetta	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
280B2 Fayette	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
280C2 Fayette	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
280D2 Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
280E2 Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
280F Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
386B Downs	Slight	Slight	Moderate: slope.	Slight	Slight.
386C2 Downs	Slight	Slight	Severe: slope.	Slight	Slight.
403D Elizabeth	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight	Severe: depth to rock.
417B Derinda	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Severe: erodes easily.	Moderate: depth to rock.
417C2 Derinda	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: depth to rock.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
417D2: Derinda	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
417E2: Derinda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
417F: Derinda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
418B: Schapville	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Slight	Moderate: depth to rock.
418C2: Schapville	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Moderate: depth to rock.
418D2: Schapville	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
419B2: Flagg	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
419C2: Flagg	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
429B2: Palsgrove	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
429C2: Palsgrove	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
429D2: Palsgrove	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
429E2: Palsgrove	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
536*. Dumps					
540C2: Frankville	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
547C2: Eleroy	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Slight.
547D2: Eleroy	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
547E2: Eleroy	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
565B: Tell	Slight	Slight	Moderate: slope.	Slight	Slight.
565C2: Tell	Slight	Slight	Severe: slope.	Slight	Slight.
569C2: Medary	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
569F2: Medary	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
572B: Loran	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
576: Zwingle	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
681E*:					
Dubuque	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight	Slight.
Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
731B: Nasset	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
731C2: Nasset	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
731D2: Nasset	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
732B: Appleriver	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
745B: Shullsburg	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, depth to rock.
753B: Massbach	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
753C2: Massbach	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
753D2: Massbach	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
755F2 Lamoille	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
779F Chelsea	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
785F Lacrescent	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
785G Lacrescent	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
800 Psamments	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
801B Orthents	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight	Slight.
864*. Pits					
873D2*:					
Dunbarton	Severe: thin layer, area reclaim.	Severe: thin layer, area reclaim.	Severe: slope, thin layer, area reclaim.	Severe: erodes easily.	Severe: thin layer, area reclaim.
Dubuque	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope, depth to rock.
873E2*:					
Dunbarton	Severe: slope, thin layer, area reclaim.	Severe: slope, thin layer, area reclaim.	Severe: slope, thin layer, area reclaim.	Severe: erodes easily.	Severe: slope, thin layer, area reclaim.
Dubuque	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
905F*:					
NewGlarus	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Lamoille	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
928D2*:					
NewGlarus	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer, area reclaim.
Palsgrove	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1334 Birds	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3077 Huntsville	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3333 Wakeland	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3451 Lawson	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3579 Beavercreek	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
7430B Raddle	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
8070 Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8239 Dorchester	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
8284 Tice	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
8366 Algansee	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
8415 Orion	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
27D2: Miami	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
29C2, 29D2: Dubuque	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
36B: Tama	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
36C: Tama	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
41B: Muscatine	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
53D: Bloomfield	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
61B: Atterberry	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
68: Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
87A: Dickinson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
88B: Sparta	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
88D: Sparta	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
119C2: Elco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
172: Hoopeston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
175B: Lamont	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
175D2: Lamont	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
261: Niota	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
274B2, 274C2, 274D2: Seaton	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
274E2, 274F: Seaton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
278B: Stronghurst	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
279B: Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
279C2: Rozetta	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
279D2: Rozetta	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280B2, 280C2, 280D2: Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280E2: Fayette	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
280F: Fayette	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Very poor.	Good	Very poor.
386B: Downs	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
386C2: Downs	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
403D: Elizabeth	Very poor.	Very poor.	Poor	Poor	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
417B: Derinda	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
417C2, 417D2: Derinda	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
417E2, 417F: Derinda	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
418B, 418C2, 418D2: Schapville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
419B2: Flagg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
419C2: Flagg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
429B2: Palsgrove	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
429C2: Palsgrove	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
429D2, 429E2: Palsgrove	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
536*. Dumps										
540C2: Frankville	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
547C2, 547D2 Eleroy	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
547E2 Eleroy	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
565B Tell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
565C2 Tell	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
569C2 Medary	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
569F2 Medary	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
572B Loran	Fair	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
576 Zwingle	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
681E*:										
Dubuque	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Orthents.										
Fayette	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
731B, 731C2, 731D2 Nasset	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
732B Appleriver	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
745B Shullsburg	Good	Good	Fair	Fair	Good	Good	Fair	Good	Fair	Fair.
753B Massbach	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
753C2, 753D2 Massbach	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
755F2 Lamoille	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
779F Chelsea	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
785F, 785G Lacrescent	Poor	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
800. Psamments										

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
801B. Orthents										
864*. Pits										
873D2*:										
Dunbarton	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Dubuque	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
873E2*:										
Dunbarton	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Dubuque	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
905F*:										
NewGlarus	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lamoille	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
928D2*:										
NewGlarus	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Palsgrove	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
1334 Birds	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
3077 Huntsville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
3333 Wakeland	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3451 Lawson	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
3579 Beavercreek	Poor	Poor	Fair	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
7430B Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8070 Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
8239 Dorchester	Fair	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor	Poor.
8284 Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
8366 Algansee	Very poor.	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
8415 Orion	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27D2 Miami	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
29C2 Dubuque	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength, frost action.	Moderate: depth to rock.
29D2 Dubuque	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, depth to rock.
36B Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
36C Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
41B Muscatine	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
53D Bloomfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
61B Atterberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
68 Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
87A Dickinson	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
88B Sparta	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
88D Sparta	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
119C2 Elco	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
172 Hoopeston	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
175B-------------- Lamont	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
175D2------------- Lamont	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
261--------------- Niota	Severe: cutbanks cave, ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
274B2------------- Seaton	Slight---------	Slight---------	Slight---------	Slight---------	Severe: low strength, frost action.	Slight.
274C2------------- Seaton	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: low strength, frost action.	Slight.
274D2------------- Seaton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
274E2, 274F------- Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
278B-------------- Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
279B-------------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
279C2------------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
279D2------------- Rozetta	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
280B2------------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
280C2------------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
280D2------------- Fayette	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
280E2, 280F------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
386B Downs	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
386C2 Downs	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
403D Elizabeth	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, low strength.	Severe: depth to rock.
417B Derinda	Moderate: depth to rock, too clayey, wetness.	Slight	Moderate: wetness, depth to rock.	Slight	Severe: low strength.	Moderate: depth to rock.
417C2 Derinda	Moderate: depth to rock, too clayey, wetness.	Slight	Moderate: wetness, depth to rock.	Moderate: slope.	Severe: low strength.	Moderate: depth to rock.
417D2 Derinda	Moderate: depth to rock, too clayey, wetness, slope.	Moderate: slope.	Moderate: wetness, depth to rock, slope.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
417E2, 417F Derinda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
418B Schapville	Moderate: depth to rock, too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: depth to rock.
418C2 Schapville	Moderate: depth to rock, too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: depth to rock.
418D2 Schapville	Moderate: depth to rock, too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
419B2 Flagg	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
419C2 Flagg	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
429B2 Palsgrove	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
429C2------------- Palsgrove	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
429D2------------- Palsgrove	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
429E2------------- Palsgrove	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
536*. Dumps						
540C2------------- Frankville	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, depth to rock.
547C2------------- Eleroy	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
547D2------------- Eleroy	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
547E2------------- Eleroy	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
565B-------------- Tell	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
565C2------------- Tell	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
569C2------------- Medary	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
569F2------------- Medary	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
572B-------------- Loran	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
576--------------- Zwingle	Severe: cutbanks cave, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
681E*:						
Dubuque	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Orthents	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
731B Nasset	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
731C2 Nasset	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
731D2 Nasset	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
732B Appleriver	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
745B Shullsburg	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, depth to rock.
753B Massbach	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
753C2 Massbach	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
753D2 Massbach	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
755F2 Lamoille	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
779F Chelsea	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
785F, 785G Lacrescent	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
800-----------Psamments	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
801B-----------Orthents	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
864*. Pits						
873D2*:						
Dunbarton	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, shrink-swell.	Severe: thin layer, area reclaim.
Dubuque	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, depth to rock.
873E2*:						
Dunbarton	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, shrink-swell.	Severe: slope, thin layer, area reclaim.
Dubuque	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
905F*:						
NewGlarus	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Lamoille	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
928D2*:						
NewGlarus	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer, area reclaim.
Palsgrove	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
1334-----------Birds	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3077 Huntsville	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3333 Wakeland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3451 Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3579 Beavercreek	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
7430B Raddle	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: low strength, frost action.	Slight.
8070 Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.
8239 Dorchester	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
8284 Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
8366 Algansee	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
8415 Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.	Moderate: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
27D2----------------- Miami	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
29C2, 29D2---------- Dubuque	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
36B----------------- Tama	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
36C----------------- Tama	Moderate: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
41B----------------- Muscatine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
53D----------------- Bloomfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
61B----------------- Atterberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
68------------------ Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
87A----------------- Dickinson	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
88B----------------- Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
88D----------------- Sparta	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
119C2--------------- Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
172----------------- Hoopeston	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
175B---------------- Lamont	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: thin layer.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
175D2---------------- Lamont	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope, thin layer.
261----------------- Niota	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
274B2--------------- Seaton	Slight-----------	Moderate: seepage, slope.	Slight-----------	Slight-----------	Good.
274C2--------------- Seaton	Slight-----------	Severe: slope.	Slight-----------	Slight-----------	Good.
274D2--------------- Seaton	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
274E2, 274F--------- Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
278B---------------- Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
279B---------------- Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
279C2--------------- Rozetta	Moderate: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
279D2--------------- Rozetta	Moderate: wetness, slope.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope.
280B2--------------- Fayette	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
280C2--------------- Fayette	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
280D2--------------- Fayette	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
280E2, 280F--------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
386B---------------- Downs	Moderate: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
386C2--------------- Downs	Moderate: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
403D: Elizabeth	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: depth to rock, large stones.
417B: Derinda	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, hard to pack.
417C2, 417D2: Derinda	Severe: depth to rock wetness, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, wetness,	Severe: depth to rock, wetness.	Poor: depth to rock, hard to pack.
417E2, 417F: Derinda	Severe: depth to rock, wetness, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, wetness, slope.	Poor: depth to rock, hard to pack, slope.
418B: Schapville	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock.
418C2, 418D2: Schapville	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock.
419B2: Flagg	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
419C2: Flagg	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
429B2: Palsgrove	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: thin layer.
429C2: Palsgrove	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: thin layer.
429D2: Palsgrove	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: thin layer.
429E2: Palsgrove	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope, thin layer.
536*. Dumps					
540C2: Frankville	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
547C2--------------- Eleroy	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Poor: thin layer.
547D2--------------- Eleroy	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness, slope.	Poor: thin layer.
547E2--------------- Eleroy	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope, thin layer.
565B---------------- Tell	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
565C2--------------- Tell	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
569C2--------------- Medary	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
569F2--------------- Medary	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
572B---------------- Loran	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: wetness.
576----------------- Zwingle	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
681E*:					
Dubuque------------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Orthents-----------	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
Fayette------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
731B---------------- Nasset	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: thin layer.
731C2--------------- Nasset	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: thin layer.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
731D2: Nasset	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: thin layer.
732B: Appleriver	Severe: wetness, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
745B: Shullsburg	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
753B: Massbach	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock.	Moderate: depth to rock.	Poor: thin layer.
753C2: Massbach	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock.	Poor: thin layer.
753D2: Massbach	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: thin layer.
755F2: Lamoille	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
779F: Chelsea	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
785F, 785G: Lacrescent	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
800: Psamments	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
801B: Orthents	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
864*. Pits					
873D2*:					
Dunbarton	Severe: thin layer, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: area reclaim, too clayey, hard to pack.
Dubuque	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
873E2*:					
Dunbarton	Severe: thin layer, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, too clayey, hard to pack.
Dubuque	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
905F*:					
NewGlarus	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope, thin layer.
Lamoille	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
928D2*:					
NewGlarus	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim, thin layer.
Palsgrove	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: thin layer.
1334 Birds	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3077 Huntsville	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
3333 Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3451 Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3579 Beavercreek	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: too sandy, large stones.
7430B Raddle	Moderate: flooding, wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Good.
8070 Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8239----------------Dorchester	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Fair: too clayey.
8284----------------Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
8366----------------Algansee	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
8415----------------Orion	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
27D2 Miami	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
29C2 Dubuque	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey.
29D2 Dubuque	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.
36B, 36C Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
41B Muscatine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
53D Bloomfield	Good	Probable	Improbable: too sandy.	Poor: too sandy.
61B Atterberry	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
68 Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
87A Dickinson	Good	Probable	Improbable: too sandy.	Fair: thin layer.
88B, 88D Sparta	Good	Probable	Improbable: too sandy.	Poor: too sandy.
119C2 Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
172 Hoopeston	Fair: wetness.	Probable	Improbable: too sandy.	Fair: small stones, thin layer.
175B Lamont	Good	Probable	Improbable: too sandy.	Fair: too clayey.
175D2 Lamont	Good	Probable	Improbable: too sandy.	Fair: too clayey, slope.
261 Niota	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
274B2, 274C2 Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
274D2------------------ Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
274E2------------------ Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
274F------------------- Seaton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
278B------------------- Stronghurst	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279B, 279C2------------ Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
279D2------------------ Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
280B2, 280C2----------- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280D2------------------ Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
280E2------------------ Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
280F------------------- Fayette	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
386B, 386C2------------ Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
403D------------------- Elizabeth	Poor: depth to rock, low strength.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.
417B, 417C2, 417D2----- Derinda	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
417E2------------------ Derinda	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
417F------------------- Derinda	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
418B, 418C2------------ Schapville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey.
418D2------------------ Schapville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
419B2, 419C2----------Flagg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
429B2, 429C2----------Palsgrove	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
429D2-----------------Palsgrove	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer, slope.
429E2-----------------Palsgrove	Fair: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
536*. Dumps				
540C2-----------------Frankville	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.
547C2-----------------Eleroy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
547D2-----------------Eleroy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer, slope.
547E2-----------------Eleroy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
565B, 565C2-----------Tell	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: thin layer.
569C2-----------------Medary	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
569F2-----------------Medary	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
572B------------------Loran	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
576-------------------Zwingle	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
681E*:				
Dubuque---------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Orthents--------------	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
681E*: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
731B Nasset	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
731C2 Nasset	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
731D2 Nasset	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim, slope.
732B Appleriver	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
745B Shullsburg	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, thin layer.
753B, 753C2 Massbach	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
753D2 Massbach	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer, slope.
755F2 Lamoille	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
779F Chelsea	Poor: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
785F Lacrescent	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
785G Lacrescent	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
800 Psamments	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
801B Orthents	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
864*. Pits				
873D2*:				
Dunbarton	Poor: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
Dubuque	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.
873E2*:				
Dunbarton	Poor: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
Dubuque	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
905F*:				
NewGlarus	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Lamoille	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
928D2*:				
NewGlarus	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, slope.
Palsgrove	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer, slope.
1334 Birds	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3077 Huntsville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3333 Wakeland	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3451 Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
3579 Beavercreek	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: too sandy, area reclaim, small stones.
7430B Raddle	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
8070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8239 Dorchester	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
8284 Tice	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
8366 Algansee	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
8415 Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
27D2: Miami	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
29C2: Dubuque	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
29D2: Dubuque	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
36B, 36C: Tama	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
41B: Muscatine	Moderate: seepage.	Moderate: wetness.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
53D: Bloomfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
61B: Atterberry	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
68: Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
87A: Dickinson	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing	Too sandy, soil blowing.	Favorable.
88B: Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
88D: Sparta	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
119C2: Elco	Moderate: seepage, slope.	Moderate: piping, wetness.	Frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily.
172: Hoopeston	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness	Wetness, too sandy.	Wetness.
175B: Lamont	Severe: seepage.	Moderate: thin layer.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
175D2: Lamont	Severe: seepage, slope.	Moderate: thin layer.	Deep to water	Slope	Slope	Slope.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
261 Niota	Moderate: seepage.	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
274B2, 274C2 Seaton	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
274D2, 274E2, 274F Seaton	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
278B Stronghurst	Moderate: seepage.	Severe: wetness.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
279B, 279C2 Rozetta	Moderate: seepage, slope.	Slight	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
279D2 Rozetta	Severe: slope.	Slight	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
280B2, 280C2 Fayette	Moderate: seepage, slope.	Slight	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280D2, 280E2 Fayette	Severe: slope.	Slight	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
280F Fayette	Severe: slope.	Slight	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
386B, 386C2 Downs	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
403D Elizabeth	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
417B, 417C2 Derinda	Moderate: depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, percs slowly, depth to rock.	Depth to rock, erodes easily, wetness.	Erodes easily, depth to rock.
417D2, 417E2, 417F Derinda	Severe: slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily, wetness.	Slope, erodes easily, depth to rock.
418B, 418C2 Schapville	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, percs slowly, depth to rock.	Depth to rock, wetness.	Depth to rock, percs slowly.
418D2 Schapville	Severe: slope.	Severe: thin layer.	Percs slowly, depth to rock, slope.	Slope, percs slowly, depth to rock.	Slope, depth to rock, wetness.	Slope, depth to rock, percs slowly.
419B2, 419C2 Flagg	Moderate: seepage, slope.	Slight	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
429B2, 429C2------ Palsgrove	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Erodes easily	Erodes easily, percs slowly.
429D2, 429E2------ Palsgrove	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
536*. Dumps						
540C2------------- Frankville	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
547C2------------- Eleroy	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
547D2, 547E2------ Eleroy	Severe: slope.	Severe: thin layer.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
565B, 565C2------- Tell	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, erodes easily.	Erodes easily, too sandy.	Erodes easily.
569C2------------- Medary	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
569F2------------- Medary	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
572B-------------- Loran	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, wetness.	Frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
576--------------- Zwingle	Severe: seepage.	Moderate: thin layer, hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
681E*:						
Dubuque----------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Orthents---------	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Favorable------	Favorable.
Fayette----------	Severe: slope.	Slight---------	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
731B Nasset	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Erodes easily	Erodes easily, percs slowly.
731C2 Nasset	Moderate: seepage, depth to rock, slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly.	Erodes easily	Erodes easily, percs slowly.
731D2 Nasset	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
732B Appleriver	Moderate: seepage, depth to rock, slope.	Severe: hard to pack, thin layer, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
745B Shullsburg	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, depth to rock, frost action.	Slope, wetness, percs slowly.	Depth to rock, wetness.	Wetness, depth to rock.
753B, 753C2 Massbach	Moderate: seepage, depth to rock, slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly.	Erodes easily	Erodes easily, percs slowly.
753D2 Massbach	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
755F2 Lamoille	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
779F Chelsea	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
785F, 785G Lacrescent	Severe: seepage, slope.	Severe: seepage, piping, large stones.	Deep to water	Slope, large stones.	Slope, large stones.	Large stones, slope.
800 Psamments	Severe: seepage.	Slight	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
801B Orthents	Moderate: seepage, slope.	Slight	Deep to water	Slope	Favorable	Favorable.
864*. Pits						
873D2*, 873E2*:						
Dunbarton	Severe: depth to rock, seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, thin layer, erodes easily.	Slope, area reclaim, depth to rock.	Slope, erodes easily, depth to rock.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
873D2*, 873E2*:						
Dubuque----------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
905F*:						
NewGlarus--------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, thin layer, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Lamoille---------	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
928D2*:						
NewGlarus--------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, thin layer, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Palsgrove--------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
1334-------------- Birds	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
3077-------------- Huntsville	Moderate: seepage.	Moderate: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
3333-------------- Wakeland	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3451-------------- Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3579-------------- Beavercreek	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, flooding.	Large stones, too sandy.	Large stones, droughty.
7430B------------- Raddle	Moderate: seepage.	Severe: piping.	Deep to water	Favorable------	Erodes easily	Erodes easily.
8070-------------- Beaucoup	Slight---------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
8239-------------- Dorchester	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
8284-------------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Favorable.
8366-------------- Algansee	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty, flooding.	Wetness, too sandy, soil blowing.	Wetness, droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
8415: Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
27D2---------- Miami	0-8	Silt loam-----	CL	A-4, A-6	0	0-2	95-100	90-100	76-95	55-75	25-35	8-15
	8-28	Clay loam-----	CL	A-6, A-7	0-1	0-5	90-100	90-95	80-95	60-80	30-45	10-20
	28-37	Loam----------	CL, SC	A-4, A-6	0-1	0-5	90-100	90-95	75-90	40-75	25-35	8-15
	37-60	Loam----------	CL, CL-ML	A-4, A-6	0-1	0-5	90-100	90-95	75-90	55-75	20-30	5-15
29C2---------- Dubuque	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	8-30	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	30-36	Clay, silty clay.	CH	A-7	0	2-10	85-95	80-90	70-85	65-85	50-70	30-45
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
29D2---------- Dubuque	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	7-29	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	29-33	Clay, silty clay.	CH	A-7	0	2-10	85-95	80-90	70-85	65-85	50-70	30-45
	33-37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
36B----------- Tama	0-14	Silt loam-----	ML, CL	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
	14-41	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	41-50	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
36C----------- Tama	0-14	Silt loam-----	ML, CL	A-6, A-7	0	0	100	100	100	95-100	35-45	10-20
	14-50	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
	50-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
41B----------- Muscatine	0-15	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	95-100	25-40	5-15
	15-47	Silty clay loam.	CL	A-7	0	0	100	100	100	95-100	40-50	20-30
	47-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
53D----------- Bloomfield	0-9	Loamy fine sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	70-100	4-35	---	NP
	9-32	Fine sand, loamy fine sand, sand.	SP, SM, SP-SM	A-2-4, A-3	0	0	100	100	70-100	4-35	---	NP
	32-60	Fine sand, loamy fine sand, sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	65-100	4-35	<20	NP-3
61B----------- Atterberry	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
	9-13	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	13-48	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	0	100	100	95-100	95-100	35-55	15-30
	48-60	Silt loam, loam.	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
68------------ Sable	0-22	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	95-100	41-65	15-35
	22-60	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	100	95-100	95-100	41-65	15-35
87A----------- Dickinson	0-8	Fine sandy loam.	SM, SC, SC-SM	A-4, A-2	0	0	100	100	85-95	30-50	15-30	NP-10
	8-14	Fine sandy loam, sandy loam.	SM, SC, SC-SM	A-4, A-2	0	0	100	100	85-95	30-50	15-30	NP-10
	14-45	Fine sandy loam, sandy loam.	SM, SC, SC-SM	A-4	0	0	100	100	85-95	35-50	15-30	NP-10
	45-60	Loamy sand, loamy fine sand, fine sand.	SM, SP-SM, SC-SM	A-2, A-3	0	0	100	100	80-95	5-20	10-20	NP-5
88B----------- Sparta	0-16	Loamy sand----	SM	A-2, A-4	0	0	85-100	85-100	50-95	15-50	---	NP
	16-36	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	0	85-100	85-100	50-95	5-50	---	NP
	36-60	Sand, fine sand.	SP-SM, SM, SP	A-2, A-3	0	0	85-100	85-100	50-95	2-30	---	NP
88D----------- Sparta	0-17	Loamy sand----	SM	A-2, A-4	0	0	85-100	85-100	50-95	15-50	---	NP
	17-43	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	0	85-100	85-100	50-95	5-50	---	NP
	43-60	Sand, fine sand.	SP-SM, SM, SP	A-2, A-3	0	0	85-100	85-100	50-95	2-30	---	NP
119C2--------- Elco	0-5	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-15
	5-34	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	95-100	85-100	25-45	10-30
	34-60	Silty clay loam, loam, clay.	CL	A-7, A-6	0	0	100	90-100	80-100	60-95	25-50	10-30
172----------- Hoopeston	0-16	Loam----------	ML, CL, CL-ML	A-4	0	0	90-100	90-100	80-95	50-60	<25	NP-10
	16-50	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0	0	90-100	90-100	60-85	25-50	<30	NP-10
	50-60	Loamy sand, sand, fine sand.	SP-SM, SM, SC, SC-SM	A-2, A-3	0	0	90-100	90-100	50-80	5-20	<25	NP-10
175B---------- Lamont	0-8	Very fine sandy loam.	SC-SM, SC	A-2, A-4	0	0	100	100	80-95	25-50	15-25	5-10
	8-48	Fine sandy loam, loam, sandy clay loam.	SC-SM, SC	A-2, A-4	0	0	100	100	85-95	30-50	20-30	5-10
	48-60	Loamy fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	0	100	100	70-90	5-25	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
175D2---------Lamont	0-9	Loam----------	CL, CL-ML	A-4	0	0	100	100	80-95	50-60	<25	5-10
	9-31	Fine sandy loam, loam, sandy clay loam.	SC-SM, SC	A-2, A-4	0	0	100	100	85-95	30-50	20-30	5-10
	31-60	Loamy fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	0	100	100	70-90	5-25	---	NP
261-----------Niota	0-8	Silt loam-----	CL, ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
	8-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	12-45	Silty clay, clay, silty clay loam.	CH	A-7	0	0	100	100	95-100	95-100	52-76	26-42
	45-60	Silt loam, loam, loamy fine sand.	ML, CL, SM, SC	A-4, A-6, A-2, A-7	0	0	100	95-100	60-90	20-90	18-48	NP-20
274B2---------Seaton	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	100	95-100	20-45	5-20
	9-53	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	90-100	25-40	5-20
	53-60	Silt loam, silt.	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
274C2---------Seaton	0-5	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	5-15
	5-48	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	90-100	25-40	5-20
	48-60	Silt loam, silt.	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
274D2---------Seaton	0-7	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	5-15
	7-60	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	90-100	25-40	5-20
274E2---------Seaton	0-6	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	20-35	5-15
	6-58	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	90-100	25-40	5-20
	58-60	Silt loam, silt.	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
274F----------Seaton	0-8	Silt loam-----	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	100	95-100	20-45	5-20
	8-52	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	100	90-100	25-40	5-20
	52-60	Silt loam, silt.	CL, CL-ML	A-4, A-6	0	0	100	100	100	90-100	25-40	5-20
278B----------Stronghurst	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	8-11	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
	11-43	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	100	98-100	40-55	20-35
	43-60	Silt loam-----	CL, CL-ML	A-6, A-4	0	0	100	100	95-100	95-100	25-40	5-20
279B----------Rozetta	0-4	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	4-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	20-30	5-15
	7-39	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-30
	39-60	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-100	25-40	7-20
279C2---------Rozetta	0-9	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	9-46	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-30
	46-60	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-100	25-40	7-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
279D2--------- Rozetta	0-8	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	95-100	24-35	8-15
	8-15	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	95-100	20-30	5-15
	15-54	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-30
	54-60	Silt loam-----	CL	A-6, A-4	0	0	100	100	95-100	85-100	25-40	7-20
280B2--------- Fayette	0-7	Silt loam-----	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
	7-47	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	47-60	Silt loam-----	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
280C2, 280D2-- Fayette	0-6	Silt loam-----	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
	6-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
280E2--------- Fayette	0-6	Silt loam-----	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
	6-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	44-60	Silt loam-----	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
280F---------- Fayette	0-15	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	15-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
386B---------- Downs	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	8-41	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	35-45	15-25
	41-60	Silt loam-----	CL	A-6	0	0	100	100	100	95-100	30-40	11-20
386C2--------- Downs	0-9	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	9-55	Silty clay loam, silt loam.	CL	A-7, A-8	0	0	100	100	100	95-100	35-45	15-25
	55-60	Silt loam-----	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
403D---------- Elizabeth	0-6	Silt loam-----	CL	A-6, A-7	0-1	0-10	80-100	70-100	60-95	50-90	30-45	10-20
	6-10	Flaggy silt loam, gravelly clay loam, cobbly loam.	CL	A-6, A-7	0-5	10-35	80-100	70-100	60-95	50-90	30-45	10-20
	10-19	Extremely cobbly loam, very cobbly loam, extremely cobbly clay loam.	CL	A-6	0-20	40-75	80-100	70-100	60-95	50-90	25-40	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
417B---------- Derinda	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
	12-22	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	95-100	95-100	90-100	40-55	15-25
	22-32	Silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	70-100	65-100	45-60	20-30
	32-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
417C2--------- Derinda	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
	9-19	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	95-100	95-100	90-100	40-55	15-25
	19-30	Silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	70-100	65-100	45-60	20-30
	30-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
417D2--------- Derinda	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
	8-17	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	95-100	95-100	90-100	40-55	15-25
	17-35	Silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	70-100	65-100	45-60	20-30
	35-45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
417E2--------- Derinda	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
	12-27	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	95-100	95-100	90-100	40-55	15-25
	27-34	Silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	70-100	65-100	45-60	20-30
	34-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
417F---------- Derinda	0-10	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
	10-20	Silty clay loam.	CL, CH, ML, MH	A-7	0	0	100	95-100	95-100	90-100	40-55	15-25
	20-31	Silty clay, clay.	CL, CH	A-7	0	0	80-100	75-100	70-100	65-100	45-60	20-30
	31-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
418B---------- Schapville	0-10	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	22-40	3-14
	10-21	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-45	15-25
	21-30	Silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	90-100	85-100	80-90	65-90	35-55	18-35
	30-32	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
418C2--------- Schapville	0-8	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	22-40	3-14
	8-19	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-45	15-25
	19-34	Silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	90-100	85-100	80-90	65-90	35-55	18-35
	34-38	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
418D2--------- Schapville	0-8	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	22-40	3-14
	8-19	Silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-45	15-25
	19-27	Silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	90-100	85-100	80-90	65-90	35-55	18-35
	27-31	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
419B2--------- Flagg	0-7	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	30-40	8-15
	7-43	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	95-100	90-100	35-50	15-30
	43-60	Clay loam, sandy clay loam, silty clay loam.	CL	A-6	0	0	95-100	90-100	85-100	60-95	25-40	11-25
419C2--------- Flagg	0-8	Silt loam-----	CL	A-4, A-6	0	0	100	100	95-100	90-100	30-40	8-15
	8-35	Silty clay loam.	CL	A-6, A-7	0	0	100	95-100	95-100	90-100	35-50	15-30
	35-60	Clay loam, sandy clay loam, silty clay loam.	CL	A-6	0	0	95-100	90-100	85-100	60-95	25-40	11-25
429B2--------- Palsgrove	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	23-35	5-14
	9-48	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	36-46	17-27
	48-57	Clay, silty clay loam, silty clay.	CH	A-7	0-2	0-5	90-95	90-95	80-95	65-90	55-75	30-45
	57	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
429C2--------- Palsgrove	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	23-35	5-14
	8-40	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	36-46	17-27
	40-50	Clay, silty clay loam, silty clay.	CH	A-7	0-2	0-5	90-95	90-95	80-95	65-90	55-75	30-45
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
429D2--------- Palsgrove	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	23-35	5-14
	8-49	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	36-46	17-27
	49-56	Clay, silty clay loam, silty clay.	CH	A-7	0-2	0-5	90-95	90-95	80-95	65-90	55-75	30-45
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
429E2--------- Palsgrove	0-5	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	23-35	5-14
	5-41	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	36-46	17-27
	41-57	Clay, silty clay loam, silty clay.	CH	A-7	0-2	0-5	90-95	90-95	80-95	65-90	55-75	30-45
	57	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
536*. Dumps												

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
540C2--------- Frankville	0-7	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	7-30	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	30-34	Clay, silty clay.	CH	A-7	0	2-10	85-95	80-90	70-85	65-80	50-70	30-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
547C2--------- Eleroy	0-11	Silt loam-----	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	80-95	25-40	5-15
	11-46	Silty clay loam.	CL	A-7, A-6	0	0	100	100	90-100	85-95	30-50	15-30
	46-52	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0	0-5	95-100	90-100	85-100	75-95	30-55	15-30
	52-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
547D2--------- Eleroy	0-6	Silt loam-----	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	80-95	25-40	5-15
	6-38	Silty clay loam.	CL	A-7, A-6	0	0	100	100	90-100	85-95	30-50	15-30
	38-46	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0	0-5	95-100	90-100	85-100	75-95	30-55	15-30
	46-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
547E2--------- Eleroy	0-7	Silt loam-----	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	80-95	25-40	5-15
	7-45	Silty clay loam.	CL	A-7, A-6	0	0	100	100	90-100	85-95	30-50	15-30
	45-50	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0	0-5	95-100	90-100	85-100	75-95	30-55	15-30
	50-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
565B---------- Tell	0-8	Silt loam-----	CL	A-4	0	0	100	100	90-100	85-95	25-30	7-10
	8-30	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	90-100	85-95	30-40	10-16
	30-34	Loam, sandy loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-2	0	0	100	90-100	55-95	25-75	20-35	4-14
	34-60	Sand, loamy sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0	100	90-100	45-75	0-30	---	NP
565C2--------- Tell	0-8	Silt loam-----	CL	A-4	0	0	100	100	90-100	85-95	25-30	7-10
	8-20	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	90-100	85-95	30-40	10-16
	20-24	Loam, sandy loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-2	0	0	100	90-100	55-95	25-75	20-35	4-14
	24-60	Sand, loamy sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	0	100	90-100	45-75	0-30	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
569C2--------- Medary	0-5	Silt loam-----	CL, CL-ML	A-4	0	0	100	100	90-100	60-75	20-30	5-10
	5-20	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	23-41
	20-60	Stratified silty clay to silt loam.	CH, CL	A-7, A-6	0	0	100	100	90-100	75-95	35-55	15-30
569F2--------- Medary	0-5	Silty clay loam.	CL	A-6	0	0	100	100	95-100	85-95	25-35	10-20
	5-20	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	23-41
	20-60	Stratified silty clay to silt loam.	CH, CL	A-7, A-6	0	0	100	100	90-100	75-95	35-55	15-30
572B---------- Loran	0-15	Silty clay loam.	CL	A-7, A-6	0	0	100	100	95-100	90-100	35-45	15-25
	15-35	Silty clay loam, silt loam, loam.	CL	A-7, A-6	0	0	100	95-100	95-100	80-100	35-50	15-25
	35-41	Silty clay loam, clay loam, silt loam.	CL	A-7, A-6	0	0-5	95-100	95-100	90-100	80-100	30-50	15-35
	41	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
576----------- Zwingle	0-11	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	11-41	Silty clay, silty clay loam, clay.	CH	A-7	0	0	100	100	100	95-100	55-70	30-40
	41-60	Stratified loam to loamy sand.	CL, SC, CL-ML, SC-SM	A-4, A-6	0	0	100	90-95	60-95	40-80	20-30	5-15
681E*: Dubuque------	0-10	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	10-30	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	30-34	Clay, silty clay.	CH	A-7	0	2-10	85-95	80-90	70-85	65-85	50-70	30-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Orthents-----	0-60	Silty clay loam, silt loam.	---	---	---	---	---	---	---	---	---	---
Fayette------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	7-47	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	47-60	Silt loam-----	CL	A-6	0	0	100	100	100	95-100	30-40	10-20

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
731B----------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
Nasset	7-42	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	42-49	Clay, silty clay.	CH	A-7	0-1	1-10	85-95	80-90	70-85	65-85	50-70	30-45
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
731C2---------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
Nasset	7-44	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	44-54	Clay, silty clay.	CH	A-7	0-1	1-10	85-95	80-90	70-85	65-85	50-70	30-45
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
731D2---------	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
Nasset	8-37	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	37-49	Clay, silty clay.	CH	A-7	0-1	1-10	85-95	80-90	70-85	65-85	50-70	30-45
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
732B----------	0-13	Silt loam-----	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	80-95	25-40	5-15
Appleriver	13-33	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	90-100	80-95	25-40	10-20
	33-43	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0-5	0-5	95-100	90-100	85-100	75-95	30-55	15-30
	43-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
745B----------	0-13	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-90	20-40	1-15
Shullsburg	13-19	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	85-90	30-45	11-25
	19-24	Silty clay, clay.	CL, CH	A-7	0	0	100	85-100	80-100	80-95	40-70	20-45
	24-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
753B----------	0-8	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
Massbach	8-31	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	15-25
	31-40	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	95-100	90-100	85-100	75-95	30-55	15-35
	40-48	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
753C2--------- Massbach	0-7	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	7-41	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	15-25
	41-51	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	95-100	90-100	85-100	75-95	30-55	15-35
	51-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
753D2--------- Massbach	0-7	Silt loam-----	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	7-37	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	15-25
	37-53	Silty clay loam, silty clay, clay.	CL, CH	A-7, A-6	0-1	0-5	95-100	90-100	85-100	75-95	30-55	15-35
	53-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
755F2--------- Lamoille	0-6	Silt loam-----	CL, CL-ML	A-6, A-4	---	0-2	95-100	90-100	90-100	80-100	18-35	4-15
	6-32	Clay, clay loam, gravelly clay.	GC, SC, CL, CH	A-7	---	5-25	65-95	55-85	50-80	40-70	40-65	15-40
	32-41	Cobbly loam, cobbly clay loam, very cobbly clay loam.	GC, SC	A-6, A-7, A-2	---	10-50	30-75	25-65	15-55	12-45	35-60	15-35
	41-60	Cobbly loam, cobbly sandy loam, very cobbly loam.	GC, GM	A-2, A-1, A-4	---	45-60	25-60	20-55	15-50	12-40	18-30	4-10
779F---------- Chelsea	0-8	Loamy fine sand.	SM, SP-SM	A-2-4	0	0	100	100	65-95	10-35	---	NP
	8-60	Fine sand, sand, loamy sand.	SP, SM, SP-SM	A-3, A-2-4	0	0	100	100	65-95	3-15	---	NP
785F---------- Lacrescent	0-17	Silt loam-----	CL, ML	A-6	---	0-15	90-100	80-100	60-95	50-90	30-40	10-15
	17-50	Cobbly silt loam, cobbly fine sandy loam, very cobbly loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	---	30-55	55-80	45-80	40-65	20-60	20-35	3-12
	50-60	Extremely cobbly loam, very cobbly silt loam, very cobbly fine sandy loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	---	50-65	50-75	40-65	35-60	15-55	<30	NP-12

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
785G---------- Lacrescent	0-18	Silty clay loam.	CL, ML	A-6	---	0-15	90-100	80-100	60-95	50-90	30-40	10-15
	18-45	Cobbly silt loam, cobbly fine sandy loam, very cobbly loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	---	30-55	55-80	45-80	40-65	20-60	20-35	3-12
	45-60	Extremely cobbly loam, very cobbly silt loam, very cobbly fine sandy loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	---	50-65	50-75	40-65	35-60	15-55	<30	NP-12
800----------- Psamments	0-6	Loamy sand----	---	---	---	---	---	---	---	---	---	---
	6-60	Sand, loamy sand.	---	---	---	---	---	---	---	---	---	---
801B---------- Orthents	0-4	Silt loam-----	---	---	---	---	---	---	---	---	---	---
	4-60	Variable------	---	---	---	---	---	---	---	---	---	---
864*. Pits												
873D2*: Dunbarton----	0-8	Silt loam-----	CL	A-6, A-4	---	0-7	85-100	80-100	80-100	70-95	25-35	7-15
	8-15	Clay, silty clay.	CH, CL	A-7	---	0-8	70-100	70-100	70-100	70-95	45-90	25-60
	15-19	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Dubuque------	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	7-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	22-27	Clay, silty clay.	CH	A-7	0	2-10	85-95	80-90	70-85	65-85	50-70	30-45
	27-31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
873E2*: Dunbarton----	0-7	Silt loam-----	CL	A-6, A-4	---	0-7	85-100	80-100	80-100	70-95	25-35	7-15
	7-13	Silty clay loam, silt loam.	CL, CH	A-6, A-7	---	0-8	70-100	70-100	70-100	70-95	35-60	15-35
	13-19	Clay, silty clay.	CH, CL	A-7	---	0-8	70-100	70-100	70-100	70-95	45-90	25-60
	19-23	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
873E2*:												
Dubuque------	0-4	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
	4-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
	22-27	Clay, silty clay.	CH	A-7	0	2-10	85-95	80-90	70-85	65-85	50-70	30-45
	27-31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
905F*:												
NewGlarus----	0-5	Silt loam-----	CL	A-6, A-7	0	0	100	100	90-100	80-90	25-45	10-25
	5-22	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	85-95	30-50	10-30
	22-34	Clay, silty clay.	CH, CL	A-7	---	0-10	85-100	85-100	80-100	65-100	45-90	25-60
	34-38	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Lamoille-----	0-16	Silt loam-----	CL, CL-ML	A-6, A-4	---	0-2	95-100	90-100	90-100	80-100	18-35	4-15
	16-38	Clay, clay loam, gravelly clay.	GC, SC, CL, CH	A-7	---	5-25	65-95	55-85	50-80	40-70	40-65	15-40
	38-60	Cobbly loam, cobbly clay loam, very cobbly clay loam.	GC, SC	A-6, A-7, A-2	---	10-50	30-75	25-65	15-55	12-45	35-60	15-35
928D2*:												
NewGlarus----	0-8	Silt loam-----	CL	A-6, A-7	0	0	100	100	90-100	80-90	25-45	10-25
	8-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	85-95	30-50	10-30
	24-36	Clay, silty clay.	CH, CL	A-7	---	0-10	85-100	85-100	80-100	65-100	45-90	25-60
	36-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Palsgrove----	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	0	100	100	100	95-100	23-35	5-14
	7-35	Silty clay loam, silt loam.	CL	A-7, A-6	0	0	100	100	100	95-100	36-46	17-27
	35-53	Clay, silty clay loam, silty clay.	CH	A-7	0-2	0-5	90-95	90-95	80-95	65-90	55-75	30-45
	53-57	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
1334---------- Birds	0-8	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15
	8-60	Silt loam-----	CL	A-4, A-6	0	0	100	95-100	90-100	80-100	24-34	8-15

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
3077---------- Huntsville	0-28	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	25-40	10-20
	28-37	Silt loam-----	CL	A-6	0	0	100	95-100	90-100	85-100	20-35	10-20
	37-60	Silt loam, loam, very fine sandy loam.	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0	95-100	90-100	85-95	30-85	20-35	5-20
3333---------- Wakeland	0-10	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
	10-60	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	27-36	4-10
3451---------- Lawson	0-6	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	20-40	5-20
	6-27	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	0	100	100	90-100	85-100	20-30	5-10
	27-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	90-100	60-100	20-45	10-25
3579---------- Beavercreek	0-4	Silt loam-----	ML, CL-ML	A-4	---	0-5	90-100	75-95	65-90	50-85	25-40	4-10
	4-18	Stratified cobbly silt loam to cobbly fine sand.	SM	A-2, A-4	---	1-25	70-100	65-92	35-70	15-45	20-35	NP-10
	18-60	Stratified very cobbly silt loam to very cobbly sand.	GM, SM	A-1, A-2	---	30-60	45-80	40-70	25-50	10-30	20-35	NP-10
7430B--------- Raddle	0-10	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	5-20
	10-52	Silt loam, loam.	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-20
	52-60	Silty clay loam, clay loam.	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
8070---------- Beaucoup	0-16	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-25
	16-27	Silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	85-100	30-45	15-30
	27-42	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	100	90-100	65-95	25-45	5-25
	42-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	90-100	60-95	20-40	5-20
8239---------- Dorchester	0-22	Silt loam-----	ML, CL-ML, CL	A-4	0	0	95-100	95-100	80-100	70-95	25-35	5-10
	22-60	Silt loam-----	ML, CL-ML, CL	A-4	0	0	95-100	95-100	80-100	70-95	25-35	5-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
8284---------- Tice	0-19	Silt loam-----	CL	A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	19-44	Silty clay loam, silt loam.	CL, CH	A-7	0	0	100	100	95-100	85-95	40-55	15-30
	44-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	0	100	100	60-95	55-80	25-45	5-20
8366---------- Algansee	0-3	Fine sandy loam.	SM, SC-SM, ML, CL-ML	A-2-4, A-4	0	0	100	100	60-90	30-65	<25	NP-7
	3-60	Stratified sand to loam.	SM, SP-SM	A-3, A-2-4	0	0	100	100	50-80	5-35	---	NP
8415---------- Orion	0-9	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	80-100	25-35	4-12
	9-27	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	0	100	100	90-100	70-80	20-30	4-10
	27-56	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	0	100	100	85-100	85-100	20-40	4-18
	56-60	Stratified silt loam to sand.	CL, CL-ML	A-4	0	0	80-100	80-100	80-100	80-100	20-30	4-10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
27D2-------------	0-8	20-27	1.30-1.45	0.6-2.0	0.19-0.21	5.6-7.3	Moderate-----	0.37	5	6	.5-2
Miami	8-28	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.1-6.0	Moderate-----	0.37			
	28-37	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low----------	0.37			
	37-60	15-26	1.45-1.60	0.6-2.0	0.17-0.19	7.4-8.4	Low----------	0.37			
29C2-------------	0-8	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	4	6	2-3
Dubuque	8-30	26-35	1.30-1.45	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	30-36	40-55	1.50-1.60	0.06-0.2	0.12-0.15	5.1-6.0	High---------	0.37			
	36-40	---	---	<0.06	---	---	-------------	----			
29D2-------------	0-7	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	4	6	2-3
Dubuque	7-29	26-35	1.30-1.45	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	29-33	40-55	1.50-1.60	0.06-0.2	0.12-0.15	5.1-6.0	High---------	0.37			
	33-37	---	---	<0.06	---	---	-------------	----			
36B--------------	0-14	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
Tama	14-41	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	41-50	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
36C--------------	0-14	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
Tama	14-50	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	50-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
41B--------------	0-15	24-27	1.28-1.32	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	4-6
Muscatine	15-47	30-35	1.28-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	47-60	22-30	1.35-1.40	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.43			
53D--------------	0-9	5-10	1.45-1.65	6.0-20	0.09-0.13	5.1-7.8	Low----------	0.15	5	2	.5-2
Bloomfield	9-32	2-10	1.45-1.65	6.0-20	0.08-0.12	5.1-7.3	Low----------	0.15			
	32-60	5-13	1.60-1.80	2.0-20	0.08-0.12	5.1-7.8	Low----------	0.15			
61B--------------	0-9	20-26	1.35-1.55	0.6-2.0	0.22-0.25	5.6-7.3	Low----------	0.32	5	6	2-4
Atterberry	9-13	15-26	1.40-1.60	0.6-2.0	0.21-0.24	5.1-7.3	Low----------	0.32			
	13-48	25-35	1.40-1.60	0.6-2.0	0.14-0.24	5.1-7.3	Moderate-----	0.43			
	48-60	18-27	1.40-1.65	0.6-2.0	0.14-0.24	5.6-7.8	Low----------	0.43			
68---------------	0-22	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	5-6
Sable	22-60	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.28			
87A--------------	0-8	10-18	1.50-1.55	2.0-6.0	0.12-0.15	5.6-7.3	Low----------	0.20	4	3	1-2
Dickinson	8-14	10-18	1.50-1.55	2.0-6.0	0.12-0.15	5.6-7.3	Low----------	0.20			
	14-45	10-15	1.45-1.55	2.0-6.0	0.12-0.15	5.1-6.5	Low----------	0.24			
	45-60	4-10	1.55-1.65	6.0-20	0.08-0.10	5.1-6.5	Low----------	0.20			
88B--------------	0-16	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low----------	0.17	5	2	1-2
Sparta	16-36	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-7.3	Low----------	0.17			
	36-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-7.8	Low----------	0.17			
88D--------------	0-17	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low----------	0.17	5	2	1-2
Sparta	17-43	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-7.3	Low----------	0.17			
	43-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-7.8	Low----------	0.17			
119C2------------	0-5	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-3
Elco	5-34	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.8	Moderate-----	0.37			
	34-60	25-45	1.45-1.70	0.06-0.6	0.14-0.20	5.1-7.8	High---------	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
172----------- Hoopeston	0-16	8-18	1.35-1.70	2.0-6.0	0.12-0.15	5.1-6.5	Low----------	0.28	4	5	2-3
	16-50	12-18	1.45-1.70	2.0-6.0	0.12-0.17	5.1-7.8	Low----------	0.28			
	50-60	2-10	1.50-1.70	6.0-20	0.05-0.10	4.5-8.4	Low----------	0.17			
175B---------- Lamont	0-8	10-15	1.50-1.55	2.0-6.0	0.16-0.18	5.1-7.3	Low----------	0.24	5	3	.5-1
	8-48	10-22	1.45-1.65	2.0-6.0	0.14-0.16	5.1-7.3	Low----------	0.24			
	48-60	2-10	1.65-1.75	6.0-20	0.09-0.11	5.1-6.5	Low----------	0.17			
175D2--------- Lamont	0-9	15-18	1.50-1.55	0.6-2.0	0.16-0.18	5.1-7.3	Low----------	0.24	5	5	0-1
	9-31	10-22	1.45-1.65	2.0-6.0	0.14-0.16	5.1-7.3	Low----------	0.24			
	31-60	2-10	1.65-1.75	6.0-20	0.09-0.11	5.1-6.5	Low----------	0.17			
261----------- Niota	0-8	20-27	1.20-1.35	0.2-0.6	0.22-0.24	5.1-7.3	Low----------	0.37	3	6	1-3
	8-12	18-25	1.30-1.55	0.2-0.6	0.18-0.22	5.1-6.0	Low----------	0.37			
	12-45	38-60	1.40-1.60	<0.06	0.09-0.13	3.6-6.0	High---------	0.37			
	45-60	12-25	1.50-1.70	0.2-2.0	0.08-0.20	5.6-7.3	Moderate-----	0.37			
274B2--------- Seaton	0-9	10-22	1.10-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	9-53	18-27	1.20-1.60	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37			
	53-60	10-25	1.20-1.50	0.6-2.0	0.20-0.22	5.6-8.4	Low----------	0.37			
274C2--------- Seaton	0-5	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	5-48	18-27	1.15-1.30	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37			
	48-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low----------	0.37			
274D2--------- Seaton	0-7	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	7-60	18-27	1.15-1.30	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37			
274E2--------- Seaton	0-6	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	6-58	18-27	1.15-1.30	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37			
	58-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low----------	0.37			
274F---------- Seaton	0-8	10-22	1.10-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	8-52	18-27	1.20-1.60	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37			
	52-60	10-25	1.20-1.50	0.6-2.0	0.20-0.22	5.6-8.4	Low----------	0.37			
278B---------- Stronghurst	0-8	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	8-11	20-27	1.30-1.50	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37			
	11-43	27-35	1.30-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	43-60	20-27	1.35-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
279B---------- Rozetta	0-4	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	4-7	12-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37			
	7-39	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	39-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
279C2--------- Rozetta	0-9	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	9-46	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	46-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
279D2--------- Rozetta	0-8	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	8-15	12-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37			
	15-54	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	54-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
280B2--------- Fayette	0-7	25-27	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37	5	6	1-2
	7-47	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	47-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
280C2, 280D2----- Fayette	0-6	25-27	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37	5	6	1-2
	6-60	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
280E2------------	0-6	25-27	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37	5	6	1-2
Fayette	6-44	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	44-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
280F-------------	0-15	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.32	5	6	2-3
Fayette	15-60	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.43			
386B-------------	0-8	15-25	1.25-1.30	2.0-6.0	0.21-0.23	5.1-7.3	Low----------	0.32	5	6	2-3
Downs	8-41	26-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	41-60	18-27	1.35-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
386C2------------	0-9	18-26	1.25-1.30	0.6-2.0	0.21-0.23	5.1-7.3	Low----------	0.32	5	6	2-3
Downs	9-55	26-35	1.30-1.35	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.43			
	55-60	22-26	1.35-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
403D-------------	0-6	18-27	1.15-1.20	0.6-2.0	0.18-0.24	6.1-8.4	Low----------	0.20	2	4L	2-5
Elizabeth	6-10	18-35	1.25-1.40	0.6-2.0	0.15-0.22	6.1-8.4	Low----------	0.20			
	10-19	18-35	1.30-1.45	0.6-2.0	0.01-0.04	6.1-8.4	Low----------	0.17			
	19	---	---	0.06-0.6	---	---	-------------	----			
417B-------------	0-12	22-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.43	3	6	1-3
Derinda	12-22	35-40	1.35-1.55	0.06-0.2	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	22-32	40-42	1.40-1.60	0.06-0.2	0.09-0.13	6.1-7.8	Moderate-----	0.32			
	32-60	---	---	<0.06	---	---	-------------	----			
417C2------------	0-9	22-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.43	3	6	1-3
Derinda	9-19	35-40	1.35-1.55	0.06-0.2	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	19-30	40-42	1.40-1.60	0.06-0.2	0.09-0.13	6.1-7.8	Moderate-----	0.32			
	30-60	---	---	<0.06	---	---	-------------	----			
417D2------------	0-8	22-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.43	3	6	1-3
Derinda	8-17	35-40	1.35-1.55	0.06-0.2	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	17-35	40-42	1.40-1.60	0.06-0.2	0.09-0.13	6.1-7.8	Moderate-----	0.32			
	35-45	---	---	<0.06	---	---	-------------	----			
417E2------------	0-12	22-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.43	3	6	1-3
Derinda	12-27	35-40	1.35-1.55	0.06-0.2	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	27-34	40-42	1.40-1.60	0.06-0.2	0.09-0.13	6.1-7.8	Moderate-----	0.32			
	34-60	---	---	<0.06	---	---	-------------	----			
417F-------------	0-10	22-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.43	3	6	1-3
Derinda	10-20	35-40	1.35-1.55	0.06-0.2	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	20-31	40-42	1.40-1.60	0.06-0.2	0.09-0.13	6.1-7.8	Moderate-----	0.32			
	31-60	---	---	<0.06	---	---	-------------	----			
418B-------------	0-10	20-27	1.10-1.25	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.32	4	6	3-5
Schapville	10-21	27-40	1.25-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.32			
	21-30	35-45	1.45-1.65	0.06-0.2	0.08-0.10	5.6-7.3	Moderate-----	0.32			
	30-32	---	---	0.01-0.2	---	---	-------------	----			
418C2------------	0-8	20-27	1.10-1.25	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.32	4	6	3-5
Schapville	8-19	27-40	1.25-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.32			
	19-34	35-45	1.45-1.65	0.06-0.2	0.08-0.10	5.6-7.3	Moderate-----	0.32			
	34-38	---	---	0.01-0.2	---	---	-------------	----			
418D2------------	0-8	20-27	1.10-1.25	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.32	4	6	3-5
Schapville	8-19	27-40	1.25-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.32			
	19-27	35-45	1.45-1.65	0.06-0.2	0.08-0.10	5.6-7.3	Moderate-----	0.32			
	27-31	---	---	0.01-0.2	---	---	-------------	----			
419B2------------	0-7	22-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	6	1-3
Flagg	7-43	27-35	1.30-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.37			
	43-60	22-30	1.45-1.60	0.6-2.0	0.07-0.10	5.1-7.3	Low----------	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
419C2------------ Flagg	0-8	22-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	6	1-3
	8-35	27-35	1.30-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.37			
	35-60	22-30	1.45-1.60	0.6-2.0	0.07-0.10	5.1-7.3	Low----------	0.37			
429B2------------ Palsgrove	0-9	21-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	1-2
	9-48	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	48-57	35-75	1.20-1.40	0.06-0.2	0.08-0.10	5.6-7.3	High---------	0.32			
	57	---	---	0.06-0.6	---	---	-------------	----			
429C2------------ Palsgrove	0-8	21-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	1-2
	8-40	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	40-50	35-75	1.20-1.40	0.06-0.2	0.08-0.10	5.6-7.3	High---------	0.32			
	50	---	---	0.06-0.6	---	---	-------------	----			
429D2------------ Palsgrove	0-8	21-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	1-2
	8-49	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	49-56	35-75	1.20-1.40	0.06-0.2	0.08-0.10	5.6-7.3	High---------	0.32			
	56	---	---	0.06-0.6	---	---	-------------	----			
429E2------------ Palsgrove	0-5	21-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	1-2
	5-41	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	41-57	35-75	1.20-1.40	0.06-0.2	0.08-0.10	5.6-7.3	High---------	0.32			
	57	---	---	0.06-0.6	---	---	-------------	----			
536*. Dumps											
540C2------------ Frankville	0-7	18-25	1.30-1.35	0.6-2.0	0.21-0.23	6.6-7.3	Moderate-----	0.37	4	6	2-3
	7-30	23-32	1.30-1.45	0.6-2.0	0.18-0.20	5.6-6.5	Moderate-----	0.43			
	30-34	40-55	1.50-1.60	0.06-0.2	0.12-0.15	6.1-7.3	High---------	0.32			
	34	---	---	<0.06	---	---	-------------	----			
547C2------------ Eleroy	0-11	22-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	4	6	1-3
	11-46	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	46-52	35-50	1.40-1.60	<0.06	0.11-0.18	7.4-8.4	Moderate-----	0.37			
	52-60	---	---	0.01-0.2	---	---	-------------	----			
547D2------------ Eleroy	0-6	22-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	4	6	1-3
	6-38	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	38-46	35-50	1.40-1.60	<0.06	0.11-0.18	7.4-8.4	Moderate-----	0.37			
	46-60	---	---	0.01-0.2	---	---	-------------	----			
547E2------------ Eleroy	0-7	22-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	4	6	1-3
	7-45	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	45-50	35-50	1.40-1.60	<0.06	0.11-0.18	7.4-8.4	Moderate-----	0.37			
	50-60	---	---	0.01-0.2	---	---	-------------	----			
565B------------- Tell	0-8	14-18	1.35-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	4	5	1-3
	8-30	20-28	1.50-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37			
	30-34	10-25	1.50-1.60	0.6-2.0	0.11-0.19	5.1-6.5	Low----------	0.37			
	34-60	2-8	1.55-1.70	6.0-20	0.04-0.07	5.1-6.5	Low----------	0.15			
565C2------------ Tell	0-8	14-18	1.35-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	4	5	1-3
	8-20	20-28	1.50-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.37			
	20-24	10-25	1.50-1.60	0.6-2.0	0.11-0.19	5.1-6.5	Low----------	0.37			
	24-60	2-8	1.55-1.70	6.0-20	0.04-0.07	5.1-6.5	Low----------	0.15			
569C2------------ Medary	0-5	15-27	1.35-1.60	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.37	3	5	1-2
	5-20	35-60	1.55-1.70	0.06-0.2	0.11-0.20	4.5-6.0	High---------	0.37			
	20-60	25-50	1.30-1.60	0.06-0.2	0.12-0.20	5.1-7.8	High---------	0.28			

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
569F2------------ Medary	0-5	27-35	1.35-1.60	0.2-0.6	0.21-0.23	5.1-6.5	Moderate-----	0.37	3	7	1-2
	5-20	35-60	1.55-1.70	0.06-0.2	0.11-0.20	4.5-6.0	High---------	0.37			
	20-60	25-50	1.30-1.60	0.06-0.2	0.12-0.20	5.1-7.8	High---------	0.28			
572B------------- Loran	0-15	27-35	1.20-1.40	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.43	3	7	2-3
	15-35	22-35	1.30-1.50	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.43			
	35-41	25-35	1.50-1.70	0.06-0.6	0.04-0.08	6.6-8.4	Moderate-----	0.32			
	41	---	---	0.01-0.2	---	---	-------------	----			
576-------------- Zwingle	0-11	18-27	1.25-1.30	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.43	3	6	2-3
	11-41	38-60	1.30-1.45	<0.06	0.12-0.16	4.5-6.5	High---------	0.43			
	41-60	8-20	1.45-1.60	2.0-6.0	0.08-0.10	6.1-6.5	Low----------	0.43			
681E*:											
Dubuque---------	0-10	18-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.37	4	6	1-2
	10-30	26-35	1.30-1.45	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	30-34	40-55	1.50-1.60	0.06-0.2	0.12-0.15	5.1-6.0	High---------	0.37			
	34	---	---	<0.06	---	---	-------------	----			
Orthents--------	0-60	18-35	1.45-1.65	0.06-2.0	0.12-0.18	---	Moderate-----	0.32	5	6	---
Fayette---------	0-7	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.32	5	6	2-3
	7-47	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.43			
	47-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
731B------------- Nasset	0-7	18-24	1.25-1.30	0.6-2.0	0.21-0.23	5.1-7.3	Moderate-----	0.28	4	6	3-4
	7-42	26-34	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	42-49	40-55	1.50-1.60	0.06-0.2	0.12-0.15	6.6-7.3	High---------	0.32			
	49	---	---	<0.06	---	---	-------------	----			
731C2------------ Nasset	0-7	18-24	1.25-1.30	0.6-2.0	0.21-0.23	5.1-7.3	Moderate-----	0.32	4	6	2-3
	7-44	26-34	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	44-54	40-55	1.50-1.60	0.06-0.2	0.12-0.15	6.6-7.3	High---------	0.32			
	54	---	---	<0.06	---	---	-------------	----			
731D2------------ Nasset	0-8	18-24	1.25-1.30	0.6-2.0	0.21-0.23	5.1-7.3	Moderate-----	0.32	4	6	2-3
	8-37	26-34	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	37-49	40-55	1.50-1.60	0.06-0.2	0.12-0.15	6.6-7.3	High---------	0.32			
	49	---	---	<0.06	---	---	-------------	----			
732B------------- Appleriver	0-13	22-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	4	6	1-3
	13-33	22-35	1.30-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Moderate-----	0.37			
	33-43	35-50	1.40-1.60	<0.2	0.08-0.17	5.1-7.8	Moderate-----	0.37			
	43-60	---	---	0.01-0.2	---	---	-------------	----			
745B------------- Shullsburg	0-13	22-35	1.40-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	4	6	4-7
	13-19	24-35	1.40-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.32			
	19-24	40-70	1.50-1.60	0.06-0.2	0.12-0.16	6.1-7.8	High---------	0.32			
	24-60	---	---	0.01-0.2	---	---	-------------	----			
753B------------- Massbach	0-8	22-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	2-4
	8-31	25-35	1.30-1.60	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	31-40	35-50	1.60-1.70	0.06-0.2	0.11-0.18	6.1-7.8	Moderate-----	0.32			
	40-48	---	---	0.01-0.2	---	---	-------------	----			
753C2------------ Massbach	0-7	22-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	2-4
	7-41	25-35	1.30-1.60	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	41-51	35-50	1.60-1.70	0.06-0.2	0.11-0.18	6.1-7.8	Moderate-----	0.32			
	51-60	---	---	0.01-0.2	---	---	-------------	----			

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
753D2------------ Massbach	0-7	22-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	2-4
	7-37	25-35	1.30-1.60	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	37-53	35-50	1.60-1.70	0.06-0.2	0.11-0.18	6.1-7.8	Moderate-----	0.32			
	53-60	---	---	0.01-0.2	---	---	-------------	----			
755F2------------ Lamoille	0-6	12-27	1.25-1.35	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.43	3	6	1-3
	6-32	35-55	1.40-1.60	0.06-0.6	0.12-0.16	5.1-6.0	Moderate-----	0.43			
	32-41	25-45	1.30-1.50	0.2-0.6	0.07-0.16	5.6-7.3	Moderate-----	0.32			
	41-60	8-27	1.30-1.50	2.0-6.0	0.06-0.12	7.4-8.4	Low----------	0.32			
779F------------- Chelsea	0-8	8-15	1.50-1.55	6.0-20	0.10-0.15	5.6-7.3	Low----------	0.17	5	2	5-1
	8-60	5-10	1.55-1.70	6.0-20	0.06-0.08	5.1-6.5	Low----------	0.17			
785F------------- Lacrescent	0-17	18-27	1.25-1.35	0.6-2.0	0.18-0.24	6.6-7.3	Low----------	0.28	3	6	3-5
	17-50	8-23	1.30-1.50	0.6-6.0	0.06-0.09	6.6-7.3	Low----------	0.32			
	50-60	8-20	1.30-1.50	2.0-6.0	0.05-0.08	7.4-7.8	Low----------	0.32			
785G------------- Lacrescent	0-18	20-30	1.25-1.35	0.6-2.0	0.18-0.24	6.6-7.3	Low----------	0.28	3	6	3-5
	18-45	8-23	1.30-1.50	0.6-6.0	0.06-0.09	6.6-7.3	Low----------	0.32			
	45-60	8-20	1.30-1.50	2.0-6.0	0.05-0.08	7.4-7.8	Low----------	0.32			
800-------------- Psamments	0-6	1-15	1.50-1.70	2.0-6.0	0.05-0.10	---	Low----------	0.10	5	2	---
	6-60	1-10	1.50-1.70	2.0-6.0	0.04-0.09	---	Low----------	0.02			
801B------------- Orthents	0-4	18-27	1.45-1.65	0.06-2.0	0.12-0.18	---	Moderate-----	0.32	5	6	---
	4-60	---	---	0.06-2.0	---	---	-------------	----			
864*. Pits											
873D2*:											
Dunbarton-------	0-8	15-27	1.10-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	2	6	1-3
	8-15	40-80	1.25-1.55	0.06-0.2	0.09-0.13	6.6-7.8	High---------	0.28			
	15-19	---	---	0.06-2.0	---	---	-------------	----			
Dubuque---------	0-7	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	4	6	2-3
	7-22	26-35	1.30-1.45	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	22-27	40-55	1.50-1.60	0.06-0.2	0.12-0.15	5.1-6.0	High---------	0.37			
	27-31	---	---	<0.06	---	---	-------------	----			
873E2*:											
Dunbarton-------	0-7	15-27	1.10-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	2	6	1-3
	7-13	24-40	1.05-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			
	13-19	40-80	1.25-1.55	0.06-0.2	0.09-0.13	6.6-7.8	High---------	0.28			
	19-23	---	---	0.06-2.0	---	---	-------------	----			
Dubuque---------	0-4	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	4	6	2-3
	4-22	26-35	1.30-1.45	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	22-27	40-55	1.50-1.60	0.06-0.2	0.12-0.15	5.1-6.0	High---------	0.37			
	27-31	---	---	<0.06	---	---	-------------	----			
905F*:											
NewGlarus-------	0-5	12-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.37	4	5	1-3
	5-22	20-35	1.25-1.45	0.2-2.0	0.18-0.22	5.6-7.3	Moderate-----	0.37			
	22-34	40-80	1.25-1.55	0.06-0.2	0.09-0.13	5.6-7.3	High---------	0.37			
	34-38	---	---	0.06-2.0	---	---	-------------	----			
Lamoille--------	0-16	12-27	1.25-1.35	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.43	3	6	1-3
	16-38	35-55	1.40-1.60	0.06-0.6	0.12-0.16	5.1-6.0	Moderate-----	0.43			
	38-60	25-45	1.30-1.50	0.2-0.6	0.07-0.16	5.6-7.3	Moderate-----	0.32			

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
928D2*:											
NewGlarus-------	0-8	12-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low-----------	0.37	4	5	1-3
	8-24	20-35	1.25-1.45	0.2-2.0	0.18-0.22	5.6-7.3	Moderate-----	0.37			
	24-36	40-80	1.25-1.55	0.06-0.2	0.09-0.13	5.6-7.3	High----------	0.37			
	36-40	---	---	0.06-2.0	---	---	-------------	----			
Palsgrove-------	0-7	21-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	4	6	1-2
	7-35	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	35-53	35-75	1.20-1.40	0.06-0.2	0.08-0.10	5.6-7.3	High----------	0.32			
	53-57	---	---	0.06-0.6	---	---	-------------	----			
1334-------------	0-8	15-25	1.30-1.50	0.2-0.6	0.21-0.25	5.6-7.8	Low-----------	0.43	5	6	1-3
Birds	8-60	18-27	1.40-1.60	0.2-0.6	0.20-0.22	5.1-7.8	Low-----------	0.43			
3077-------------	0-28	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Moderate-----	0.28	5	6	3-4
Huntsville	28-37	18-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Moderate-----	0.28			
	37-60	10-25	1.20-1.50	0.6-2.0	0.17-0.21	5.6-7.8	Low-----------	0.28			
3333-------------	0-10	10-17	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	5	5	1-3
Wakeland	10-60	10-17	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.37			
3451-------------	0-6	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low-----------	0.28	5	5	3-7
Lawson	6-27	10-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low-----------	0.28			
	27-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
3579-------------	0-4	10-18	1.30-1.45	2.0-6.0	0.20-0.22	6.1-7.3	Low-----------	0.24	3	5	2-3
Beavercreek	4-18	5-18	1.40-1.50	2.0-6.0	0.14-0.18	6.1-7.3	Low-----------	0.17			
	18-60	5-18	1.40-1.50	2.0-6.0	0.04-0.08	6.6-7.8	Low-----------	0.17			
7430B------------	0-10	12-24	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	5	2-4
Raddle	10-52	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.43			
	52-60	25-35	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.8	Moderate-----	0.43			
8070-------------	0-16	27-35	1.15-1.35	0.2-0.6	0.15-0.20	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	16-27	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	27-42	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			
	42-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
8239-------------	0-22	11-30	1.20-1.30	0.6-2.0	0.20-0.22	7.4-8.4	Low-----------	0.37	5	4L	.5-2
Dorchester	22-60	18-24	1.20-1.30	0.6-2.0	0.20-0.22	7.4-8.4	Low-----------	0.37			
8284-------------	0-19	22-27	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	6	2-3
Tice	19-44	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	44-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
8366-------------	0-3	5-15	1.35-1.50	2.0-6.0	0.12-0.14	4.5-7.8	Low-----------	0.24	5	3	2-4
Algansee	3-60	0-15	1.40-1.65	6.0-20	0.05-0.10	4.5-8.4	Low-----------	0.17			
8415-------------	0-9	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low-----------	0.37	5	5	1-3
Orion	9-27	10-18	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.37			
	27-56	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low-----------	0.37			
	56-60	10-18	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.8	Low-----------	0.37			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding," "water table," and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Ris
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unco st
					Ft			In			
27D2 Miami	B	None	---	---	>6.0	---	---	>60	---	Moderate	Mode
29C2, 29D2 Dubuque	B	None	---	---	>6.0	---	---	25-40	Hard	High	Mode
36B, 36C Tama	B	None	---	---	4.0-6.0	Apparent	Nov-Jun	>60	---	High	Mode
41B Muscatine	B	None	---	---	2.0-4.0	Apparent	Nov-Jul	>60	---	High	High
53D Bloomfield	A	None	---	---	>6.0	---	---	>60	---	Low	Low-
61B Atterberry	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High
68 Sable	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High
87A Dickinson	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low-
88B, 88D Sparta	A	None	---	---	>6.0	---	---	>60	---	Low	Low-
119C2 Elco	B	None	---	---	2.5-4.5	Perched	Mar-May	>60	---	High	High
172 Hoopeston	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	Low-
175B, 175D2 Lamont	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low-
261 Niota	D	None	---	---	+.5-2.0	Perched	Mar-Jun	>60	---	High	High
274B2, 274C2, 274D2, 274E2, 274F Seaton	B	None	---	---	>6.0	---	---	>60	---	High	Low-
278B Stronghurst	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Ris
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unco st
					Ft			In			
279B, 279C2, 279D2 Rozetta	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High	Mode
280B2, 280C2, 280D2, 280E2, 280F Fayette	B	None	---	---	>6.0	---	---	>60	---	High	Mode
386B Downs	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High	Mode
386C2 Downs	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High	Mode
403D Elizabeth	B	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low-
417B, 417C2, 417D2, 417E2, 417F Derinda	C	None	---	---	2.5-4.0	Apparent	Mar-Jun	25-40	Soft	Moderate	Mode
418B, 418C2, 418D2 Schapville	C	None	---	---	2.5-4.0	Apparent	Mar-Jun	25-40	Soft	Moderate	High
419B2, 419C2 Flagg	B	None	---	---	>6.0	---	---	>60	---	High	Mode
429B2, 429C2, 429D2, 429E2 Palsgrove	B	None	---	---	>6.0	---	---	40-60	Hard	High	High
536*. Dumps											
540C2 Frankville	B	None	---	---	>6.0	---	---	20-40	Hard	High	Mode
547C2, 547D2, 547E2 Eleroy	B	None	---	---	2.5-6.0	Perched	Feb-May	40-60	Soft	High	High
565B, 565C2 Tell	B	None	---	---	>6.0	---	---	>60	---	High	Mode

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Ris
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unco st
					Ft			In			
569C2, 569F2------ Medary	C	None--------	---	---	2.5-6.0	Perched	Nov-May	>60	---	Moderate	High
572B-------------- Loran	B	None--------	---	---	1.0-3.0	Perched	Feb-Jun	40-60	Soft	High-----	High
576--------------- Zwingle	D	None--------	---	---	1.0-2.0	Perched	Nov-Jul	>60	---	Moderate	High
681E*:											
Dubuque----------	B	None--------	---	---	>6.0	---	---	25-40	Hard	High-----	Mode
Orthents---------	-	None--------	---	---	>6.0	---	---	>60	---	---	-
Fayette----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Mode
731B, 731C2, 731D2------------ Nasset	B	None--------	---	---	>6.0	---	---	45-60	Hard	High-----	Mode
732B-------------- Appleriver	B	None--------	---	---	1.5-3.0	Perched	Feb-Jun	45-60	Soft	High-----	High
745B-------------- Shullsburg	C	None--------	---	---	1.0-3.0	Perched	Nov-May	20-40	Soft	High-----	Mode
753B, 753C2, 753D2------------ Massbach	B	None--------	---	---	3.0-5.0	Perched	Feb-Jun	40-60	Soft	High-----	High
755F2------------- Lamoille	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low-
779F-------------- Chelsea	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low-
785F, 785G-------- Lacrescent	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low-
800--------------- Psamments	A	None--------	---	---	>6.0	---	---	>60	---	---	-
801B-------------- Orthents	-	None--------	---	---	>6.0	---	---	>60	---	---	-
864*. Pits											

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk[...]
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unco[...] st[...]
					Ft			In			
873D2*, 873E2*:											
Dunbarton	D	None	---	---	>6.0	---	---	12-20	Hard	Moderate	Mode[...]
Dubuque	B	None	---	---	>6.0	---	---	20-40	Hard	High	Mode[...]
905F*:											
NewGlarus	B	None	---	---	>6.0	---	---	25-40	Soft	High	Mode[...]
Lamoille	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low-[...]
928D2*:											
NewGlarus	B	None	---	---	>6.0	---	---	25-40	Soft	High	Mode[...]
Palsgrove	B	None	---	---	>6.0	---	---	40-60	Hard	High	High
1334 Birds	C/D	Frequent	Long	Feb-Jun	+.5-1.0	Apparent	Mar-Jun	>60	---	High	High
3077 Huntsville	B	Frequent	Very brief	Mar-May	>6.0	---	---	>60	---	High	Low-[...]
3333 Wakeland	C	Frequent	Long	Feb-May	1.0-3.0	Apparent	Jan-May	>60	---	High	High
3451 Lawson	C	Frequent	Brief	Mar-May	1.0-3.0	Apparent	Nov-May	>60	---	High	Mode[...]
3579 Beavercreek	B	Frequent	Very brief	Mar-Jun	4.0-6.0	Apparent	Feb-May	>60	---	Low	Low-[...]
7430B Raddle	B	Rare	---	---	4.0-6.0	Apparent	Feb-May	>60	---	High	Mode[...]
8070 Beaucoup	B/D	Occasional	Brief	Mar-May	+.5-1.0	Apparent	Feb-Jun	>60	---	High	High
8239 Dorchester	B	Occasional	Very brief	Mar-May	4.0-6.0	Apparent	Feb-May	>60	---	High	High
8284 Tice	B	Occasional	Very brief	Mar-May	1.5-3.0	Apparent	Mar-Jun	>60	---	High	High
8366 Algansee	B	Occasional	Long	Feb-May	1.0-2.0	Apparent	Nov-May	>60	---	Moderate	Low-[...]
8415 Orion	C	Occasional	Very brief	Mar-May	1.0-3.0	Apparent	Nov-May	>60	---	High	High

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name	Sample number	Horizon designator	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ cu ft	Pct					Pct			
Schapville silt loam:	S78IL-43-10-1	Ap	0-10	102.2	19.8	99.9	99.7	99.4	98.1	34.5	9.0	A-4(10)	ML
	-10-2	Bt	10-21	101.3	20.3	---	100	99.7	98.6	41.4	19.9	A-7-6(21)	CL
	-10-3	2Bt	21-30	102.4	19.8	---	100	99.8	98.9	44.4	23.4	A-7-6(25)	CL
Shullsburg silt loam:	S78IL-43-21-1	AB	9-13	94.1	23.7	---	100	100	99.2	44.8	16.1	A-7-6(20)	ML
	-21-2	Bt1	13-19	96.2	22.4	99.8	98.6	97.4	95.8	53.7	29.5	A-7-6(32)	CH
	-21-3	2Bt2	19-24	103.4	20.5	99.0	92.2	91.8	81.0	49.4	28.4	A-7-6(23)	CL
	-21-4	2C1	24-40	99.8	20.8	---	100	97.8	95.9	34.7	17.2	A-6(16)	CL
Zwingle silt loam:	S78IL-43-27-1	Ap	0-8	97.4	21.0	---	100	96.8	83.0	39.2	12.4	A-6(11)	ML
	-27-2	Bt	8-27	85.2	24.4	100	98.7	98.4	92.1	72.7	36.5	A-7-5(41)	MH
	-27-3	Bt	27-43	92.6	25.0	---	100	99.0	97.0	72.6	46.9	A-7-6(53)	CH
	-27-4	C	43-60	105.0	19.8	---	100	98.4	96.4	44.3	26.1	A-7-6(27)	CL

TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that in one or more of the map units the soil is a taxadjunct to the series. The text identifies those map units and describes the characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Algansee	Mixed, mesic Aquic Udipsamments
Appleriver	Fine-silty, mixed, mesic Aquic Hapludalfs
Atterberry	Fine-silty, mixed, mesic Udollic Ochraqualfs
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
*Beavercreek	Loamy-skeletal, mixed, nonacid, mesic Typic Udifluvents
Birds	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Bloomfield	Sandy, mixed, mesic Psammentic Hapludalfs
Chelsea	Mixed, mesic Argic Udipsamments
Derinda	Fine, mixed, mesic Typic Hapludalfs
Dickinson	Coarse-loamy, mixed, mesic Typic Hapludolls
Dorchester	Fine-silty, mixed (calcareous), mesic Typic Udifluvents
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
Dubuque	Fine-silty, mixed, mesic Typic Hapludalfs
Dunbarton	Clayey, montmorillonitic, mesic Lithic Hapludalfs
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
Eleroy	Fine-silty, mixed, mesic Typic Hapludalfs
Elizabeth	Loamy-skeletal, mixed, mesic Lithic Hapludolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
*Flagg	Fine-silty, mixed, mesic Typic Hapludalfs
Frankville	Fine-silty, mixed, mesic Mollic Hapludalfs
Hoopeston	Coarse-loamy, mixed, mesic Aquic Hapludolls
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls
Lacrescent	Loamy-skeletal, mixed, mesic Typic Hapludolls
Lamoille	Fine, mixed, mesic Typic Hapludalfs
Lamont	Coarse-loamy, mixed, mesic Typic Hapludalfs
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Loran	Fine-silty, mixed, mesic Aquic Argiudolls
Massbach	Fine-silty, mixed, mesic Mollic Hapludalfs
Medary	Fine, mixed, mesic Typic Hapludalfs
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Muscatine	Fine-silty, mixed, mesic Aquic Hapludolls
Nasset	Fine-silty, mixed, mesic Mollic Hapludalfs
NewGlarus	Fine-silty over clayey, mixed, mesic Typic Hapludalfs
Niota	Fine, mixed, mesic Mollic Albaqualfs
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Orthents
*Palsgrove	Fine-silty, mixed, mesic Typic Hapludalfs
Psamments	Psamments
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
*Schapville	Fine, mixed, mesic Typic Argiudolls
Seaton	Fine-silty, mixed, mesic Typic Hapludalfs
Shullsburg	Fine, mixed, mesic Aquic Argiudolls
Sparta	Sandy, mixed, mesic Entic Hapludolls
Stronghurst	Fine-silty, mixed, mesic Aeric Ochraqualfs
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Tell	Fine-silty over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Wakeland	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents
Zwingle	Fine, montmorillonitic, mesic Typic Albaqualfs

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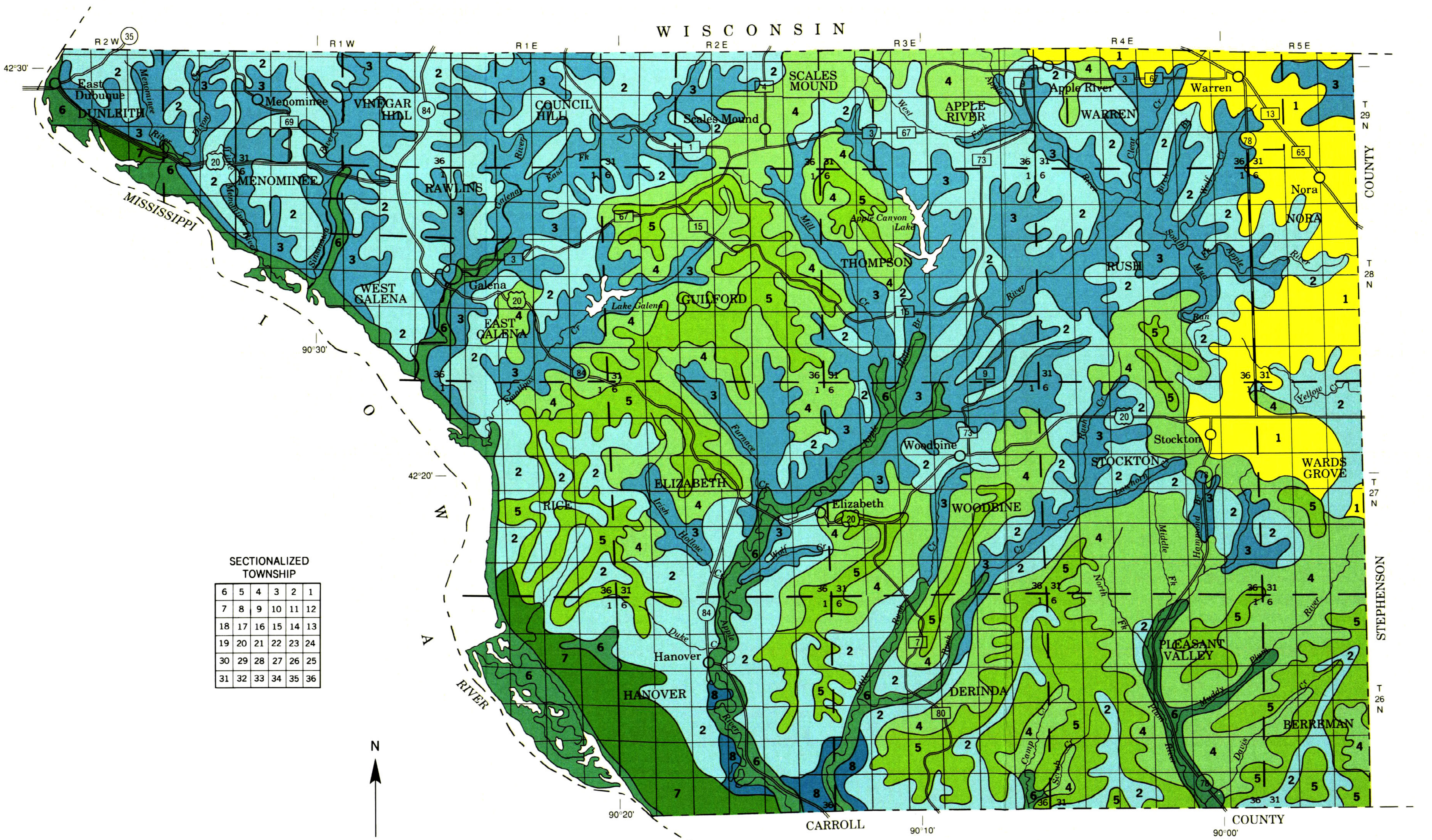
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



SOIL LEGEND*

1	Tama-Muscatine association
2	Fayette-Palsgorve-Rozetta association
3	Dubuque-Lacrescent-Dunbarton association
4	Rozetta-Eleroy-Derinda association
5	NewGlarus-Lamoille-Lacrescent association
6	Wakeland-Dorchester-Birds association
7	Sparta-Lamont association
8	Zwingle-Medary association

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1989

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCE CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

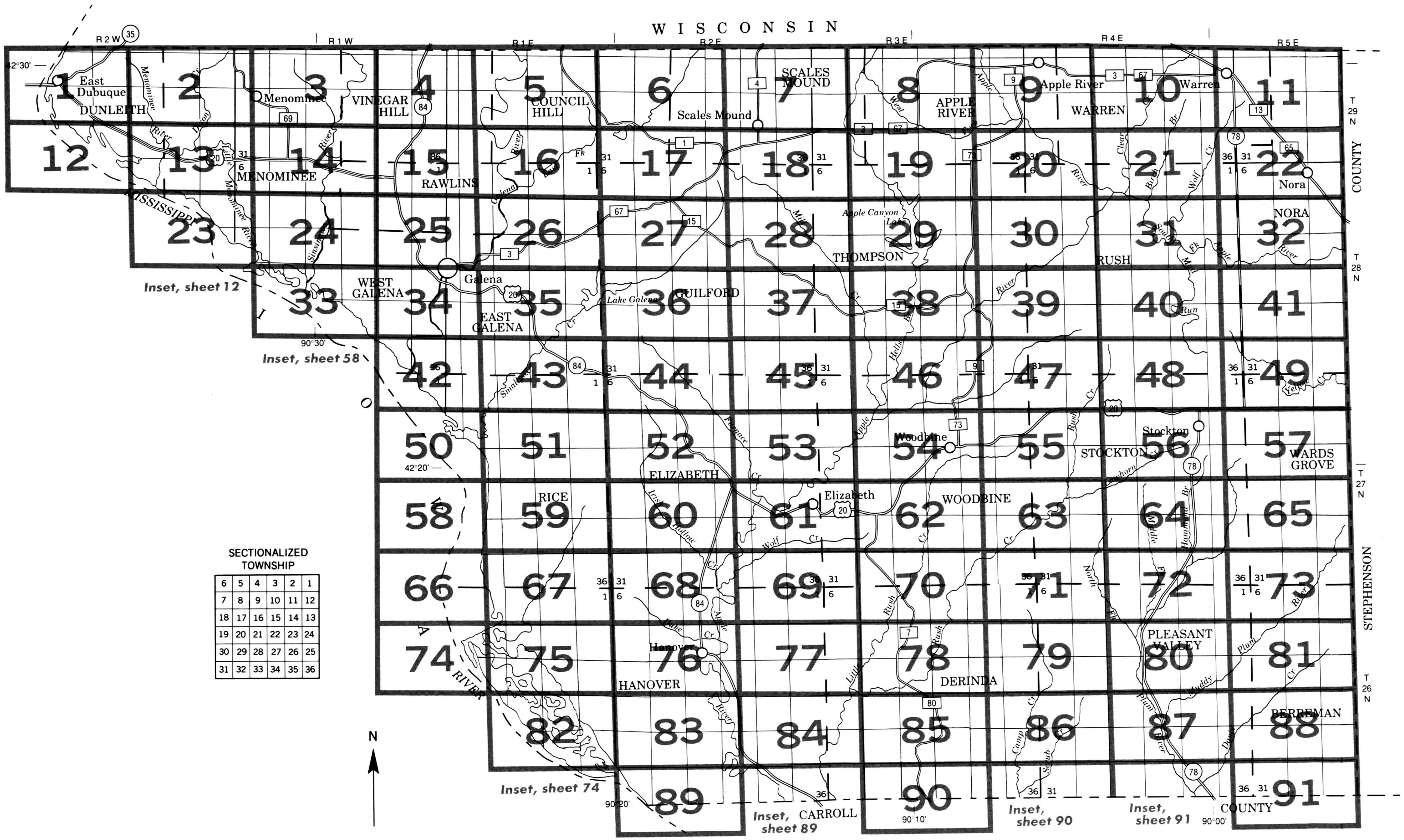
GENERAL SOIL MAP

JO DAVIESS COUNTY, ILLINOIS

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km



INDEX TO MAP SHEETS

JO DAVIESS COUNTY, ILLINOIS

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of numbers, or a combination of numbers and letters. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of two following the slope letter indicates that the soil is moderately eroded.

SYMBOL	NAME
27D2	Miami silt loam, 10 to 15 percent slopes, eroded
29C2	Dubuque silt loam, 4 to 10 percent slopes, eroded
29D2	Dubuque silt loam, 10 to 15 percent slopes, eroded
36B	Tama silt loam, 2 to 5 percent slopes
36C	Tama silt loam, 5 to 10 percent slopes
41B	Muscatine silt loam, 1 to 3 percent slopes
53D	Bloomfield loamy fine sand, 7 to 15 percent slopes
61B	Atterberry silt loam, 1 to 3 percent slopes
68	Sable silty clay loam
87A	Dickinson fine sandy loam, 0 to 3 percent slopes
88B	Sparta loamy sand, 1 to 7 percent slopes
88D	Sparta loamy sand, 7 to 15 percent slopes
119C2	Elco silt loam, 5 to 10 percent slopes, eroded
172	Hoopeston loam
175B	Lamont fine sandy loam, 1 to 7 percent slopes
175D2	Lamont fine sandy loam, 7 to 15 percent slopes, eroded
261	Niota silt loam
274B2	Seaton silt loam, 2 to 5 percent slopes, eroded
274C2	Seaton silt loam, 5 to 10 percent slopes, eroded
274D2	Seaton silt loam, 10 to 15 percent slopes, eroded
274E2	Seaton silt loam, 15 to 25 percent slopes, eroded
274F	Seaton silt loam, 25 to 45 percent slopes
278B	Stronghurst silt loam, 1 to 3 percent slopes
279B	Rozetta silt loam, 2 to 5 percent slopes
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded
279D2	Rozetta silt loam, 10 to 15 percent slopes, eroded
280B2	Fayette silt loam, 2 to 5 percent slopes, eroded
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded
280E2	Fayette silt loam, 15 to 25 percent slopes, eroded
280F	Fayette silt loam, 25 to 40 percent slopes
386B	Downs silt loam, 2 to 5 percent slopes
386C2	Downs silt loam, 5 to 10 percent slopes, eroded
403D	Elizabeth silt loam, 7 to 15 percent slopes
417B	Derinda silt loam, 2 to 5 percent slopes
417C2	Derinda silt loam, 5 to 10 percent slopes, eroded
417D2	Derinda silt loam, 10 to 15 percent slopes, eroded
417E2	Derinda silt loam, 15 to 25 percent slopes, eroded
417F	Derinda silt loam, 25 to 45 percent slopes
418B	Schapville silt loam, 2 to 5 percent slopes
418C2	Schapville silt loam, 5 to 10 percent slopes, eroded
418D2	Schapville silt loam, 10 to 15 percent slopes, eroded
419B2	Flagg silt loam, 2 to 5 percent slopes, eroded
419C2	Flagg silt loam, 5 to 10 percent slopes, eroded
429B2	Palsgrove silt loam, 2 to 5 percent slopes, eroded
429C2	Palsgrove silt loam,, 5 to 10 percent slopes, eroded
429D2	Palsgrove silt loam, 10 to 15 percent slopes, eroded
429E2	Palsgrove silt loam, 15 to 25 percent slopes, eroded
536	Dumps, mine
540C2	Frankville silt loam, 4 to 10 percent slopes, eroded
547C2	Eleroy silt loam, 5 to 10 percent slopes, eroded
547D2	Eleroy silt loam, 10 to 15 percent slopes, eroded
547E2	Eleroy silt loam, 15 to 25 percent slopes, eroded
565B	Tell silt loam, 2 to 5 percent slopes
565C2	Tell silt loam, 5 to 10 percent slopes, eroded
569C2	Medary silty clay loam, 3 to 12 percent slopes, eroded
569F2	Medary silty clay loam, 15 to 45 percent slopes, eroded
572B	Loran silty clay loam, 3 to 7 percent slopes
576	Zwingle silt loam
681E	Dubuque-Orthents-Fayette complex, 12 to 25 percent slopes, pitted
731B	Nasset silt loam, 2 to 5 percent slopes
731C2	Nasset silt loam, 5 to 10 percent slopes, eroded
731D2	Nasset silt loam, 10 to 15 percent slopes, eroded
732D	Appleriver silt loam, 2 to 5 percent slopes
745B	Shullsburg silt loam, 3 to 7 percent slopes
753B	Massbach silt loam, 2 to 5 percent slopes
753C2	Massbach silt loam, 5 to 10 percent slopes, eroded
753D2	Massbach silt loam, 10 to 15 percent slopes, eroded
755F2	Lamoille silt loam, 15 to 30 percent slopes, eroded
779F	Chelsea loamy fine sand, 20 to 45 percent slopes
785F	Lacrescent silt loam, 15 to 30 percent slopes
785G	Lacrescent silty clay loam, 30 to 50 percent slopes
800	Psamments, nearly level
801B	Orthents silty, undulating
864	Pits, quarries
873D2	Dunbarton-Dubuque silt loams, 7 to 15 percent slopes, eroded
873E2	Dunbarton-Dubuque silt loams, 15 to 25 percent slopes, eroded
905F	NewGlarus-Lamoille silt loams, 15 to 35 percent slopes
928D2	NewGlarus-Palsgrove silt loams, 7 to 15 percent slopes, eroded
1334	Birds silt loam, wet
3077	Huntsville silt loam, frequently flooded
3333	Wakeland silt loam, frequently flooded
3451	Lawson silt loam, frequently flooded
3579	Beavercreek silt loam, frequently flooded
7430B	Raddle silt loam, 1 to 4 percent slopes, rarely flooded
8070	Beaucoup silty clay loam, occasionally flooded
8239	Dorchester silt loam, occasionally flooded
8284	Tice silt loam, occasionally flooded
8366	Algansee fine sandy loam, occasionally flooded
8415	Orion silt loam, occasionally flooded
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Reservation (national forest or park, state forest or park)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery — Davis Airstrip

STATE COORDINATE TICK — 890 000 FEET

LAND DIVISION CORNERS (sections)

ROAD EMBLEMS & DESIGNATIONS

- Federal — 20
- State — 84

LEVEES

- Without road

DAMS

- Large (to scale)
- Medium or small — water, w

PITS

- Gravel pit
- Mine or quarry

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Drainage ditch

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 29C2, 29D2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

DEPRESSION OR SINK

SOIL SAMPLE SITE — S

MISCELLANEOUS

- Dumps and other similar non soil areas
- Rock outcrop (includes sandstone and shale)
- Sandy spot
- Severely eroded spot
- Stony spot, very stony spot
- Muck spot
- Calcareous spot
- Glacial till spot
- Hand dug mine

1

N

Scale 1:15 840

1 Mile

5 000 Feet

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JO DAVIESS COUNTY, ILLINOIS NO. 1

JO DAVIESS COUNTY, ILLINOIS NO. 10

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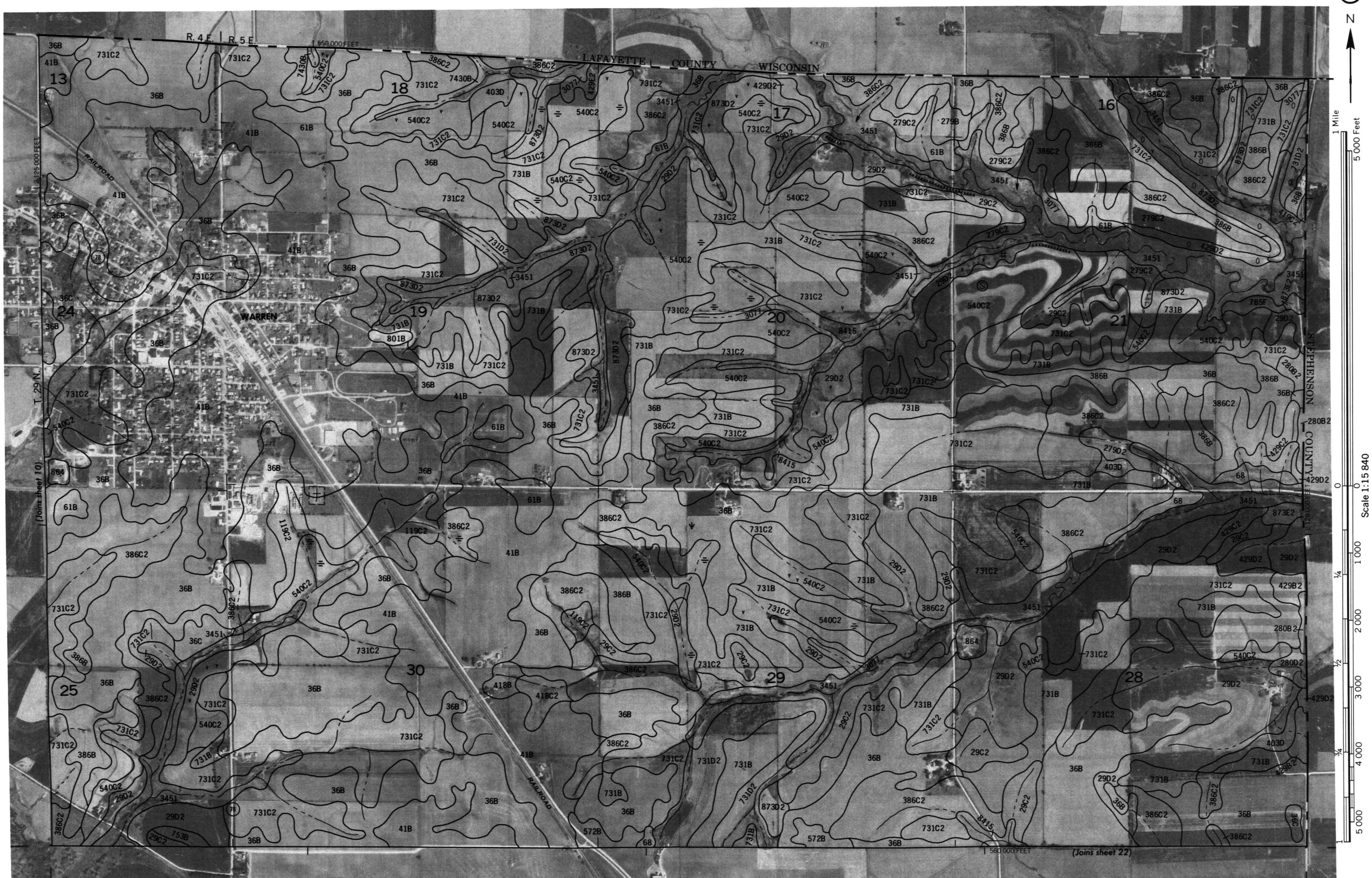

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JO DAVIESS COUNTY, ILLINOIS NO. 11

12

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 12

JO DAVIESS COUNTY, ILLINOIS NO. 12

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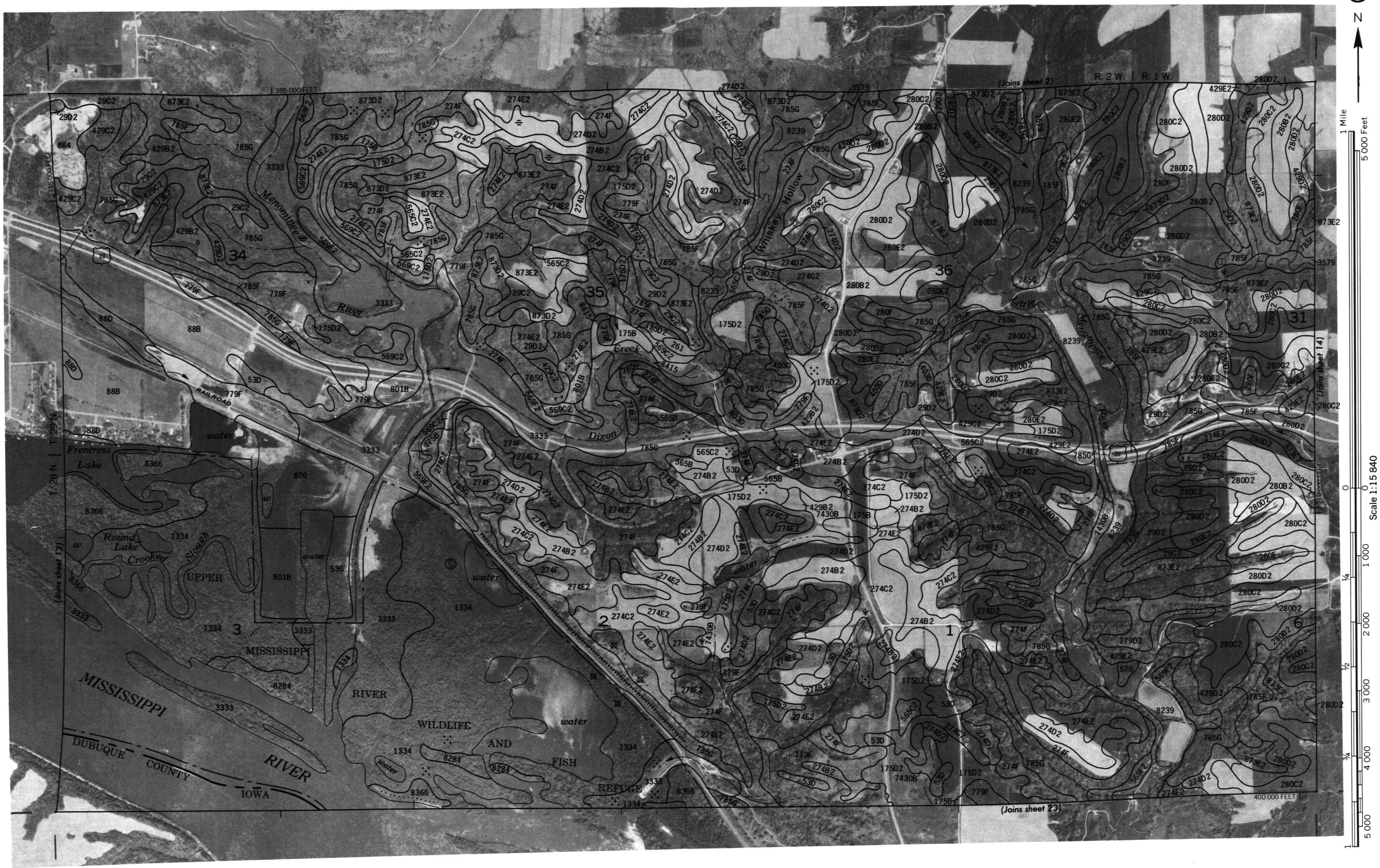

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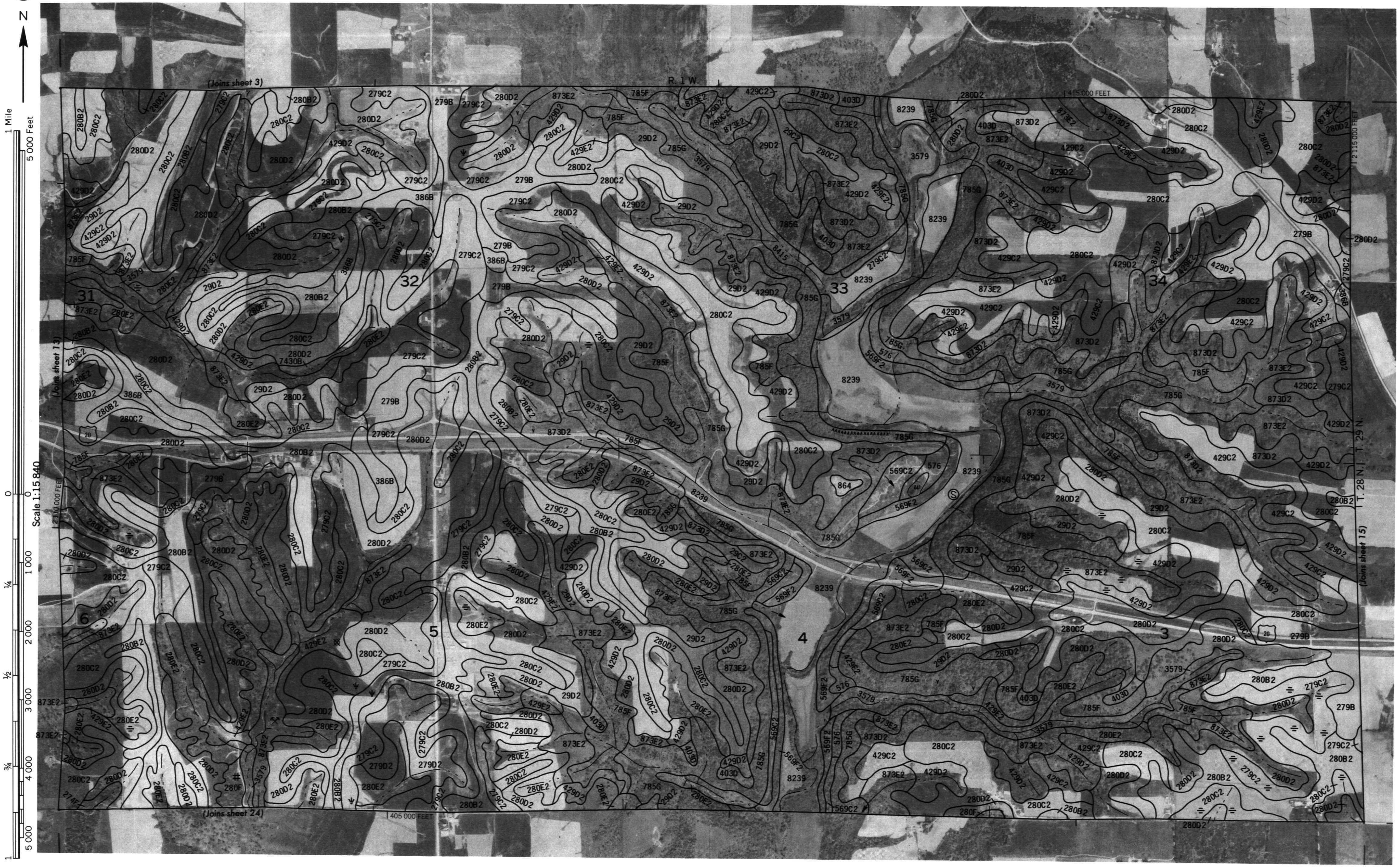

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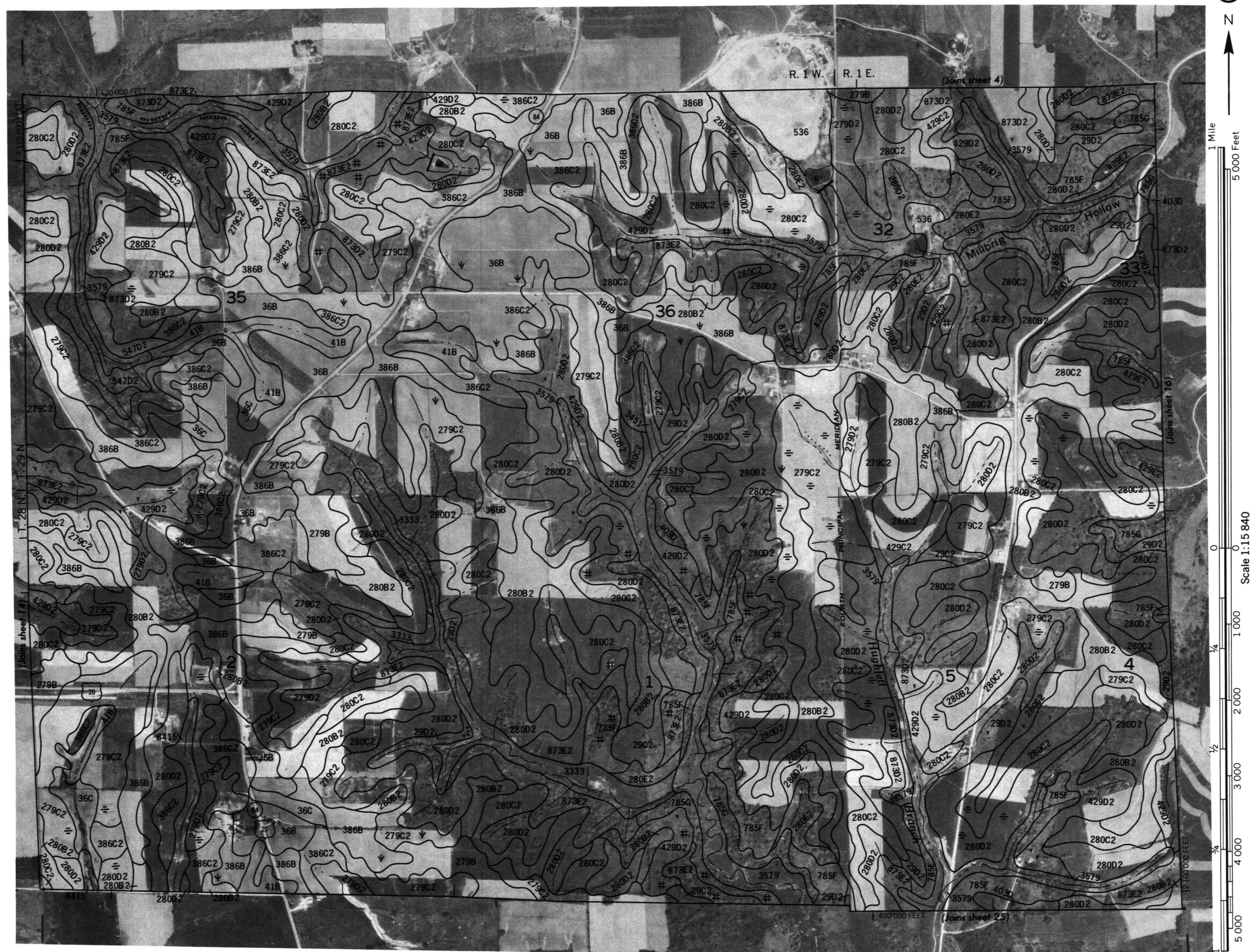
JO DAVIESS COUNTY, ILLINOIS NO. 15



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JO DAVIESS COUNTY, ILLINOIS NO. 17

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 18

N

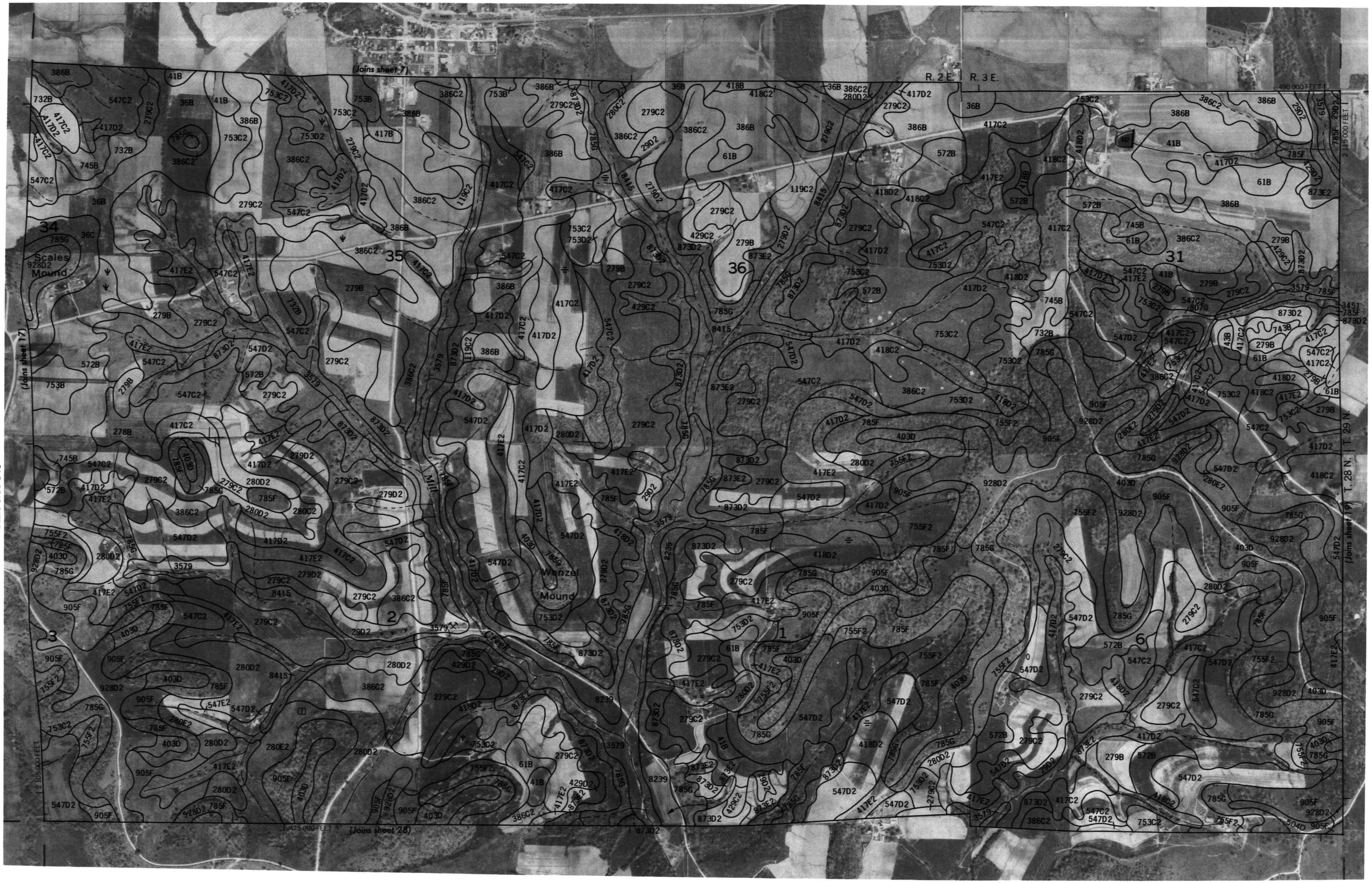
1 Mile

5 000 Feet

Scale 1:15 840

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1



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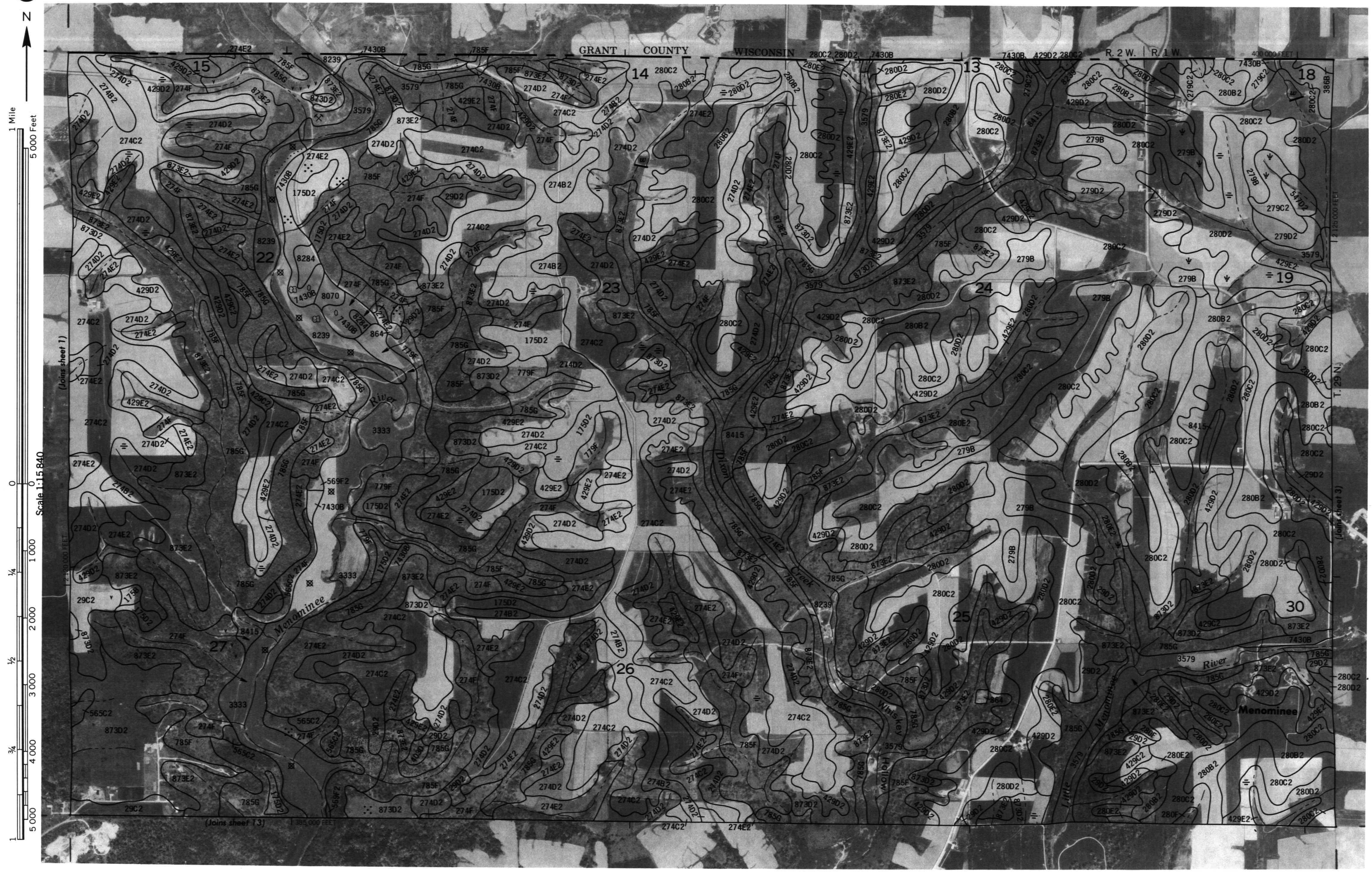
JO DAVIESS COUNTY, ILLINOIS NO. 19

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 2



JO DAVIESS COUNTY, ILLINOIS NO. 2

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 20

JO DAVIESS COUNTY, ILLINOIS NO. 20

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 21

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 22

JO DAVIESS COUNTY, ILLINOIS NO. 22

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 23

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 24

N

1 Mile

5 000 Feet

Scale 1:15 840

JO DAVIESS COUNTY, ILLINOIS NO. 24

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

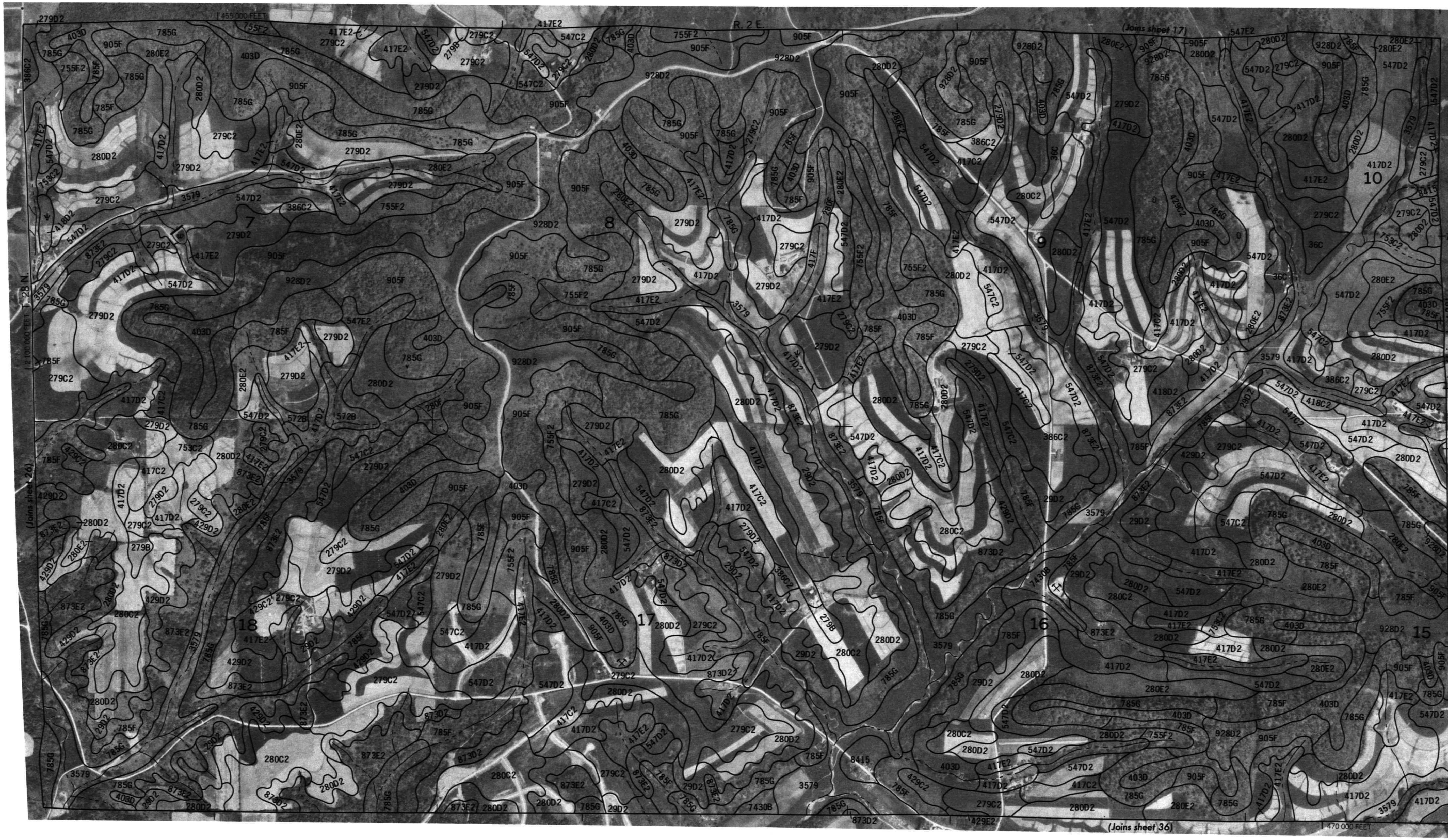
JO DAVIESS COUNTY, ILLINOIS NO. 25

JO DAVIESS COUNTY, ILLINOIS NO. 26

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

27

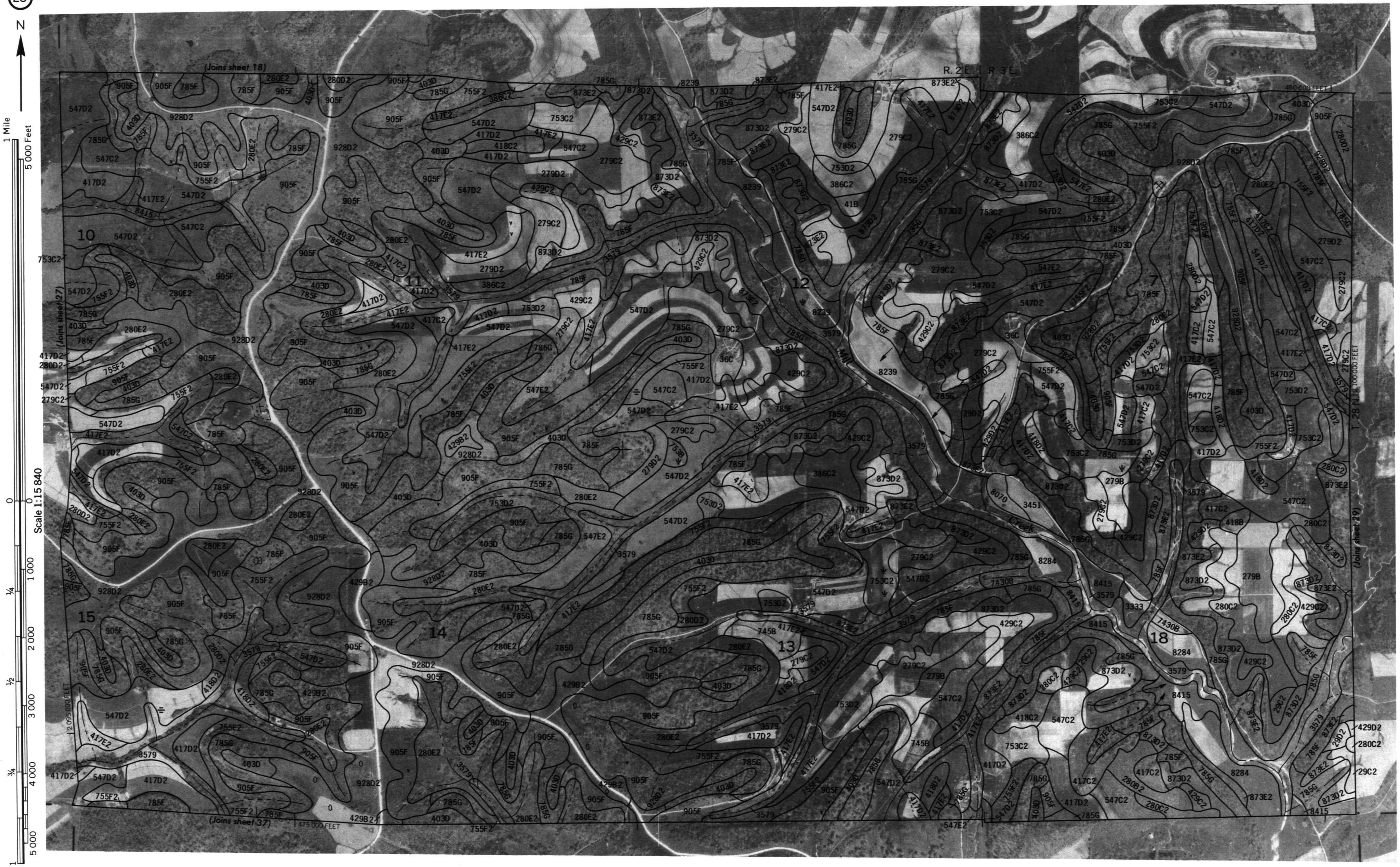
N



1 Mile
5 000 Feet
Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 27



JO DAVIESS COUNTY, ILLINOIS NO. 28

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

29

This map is compiled on 1975 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 29

N

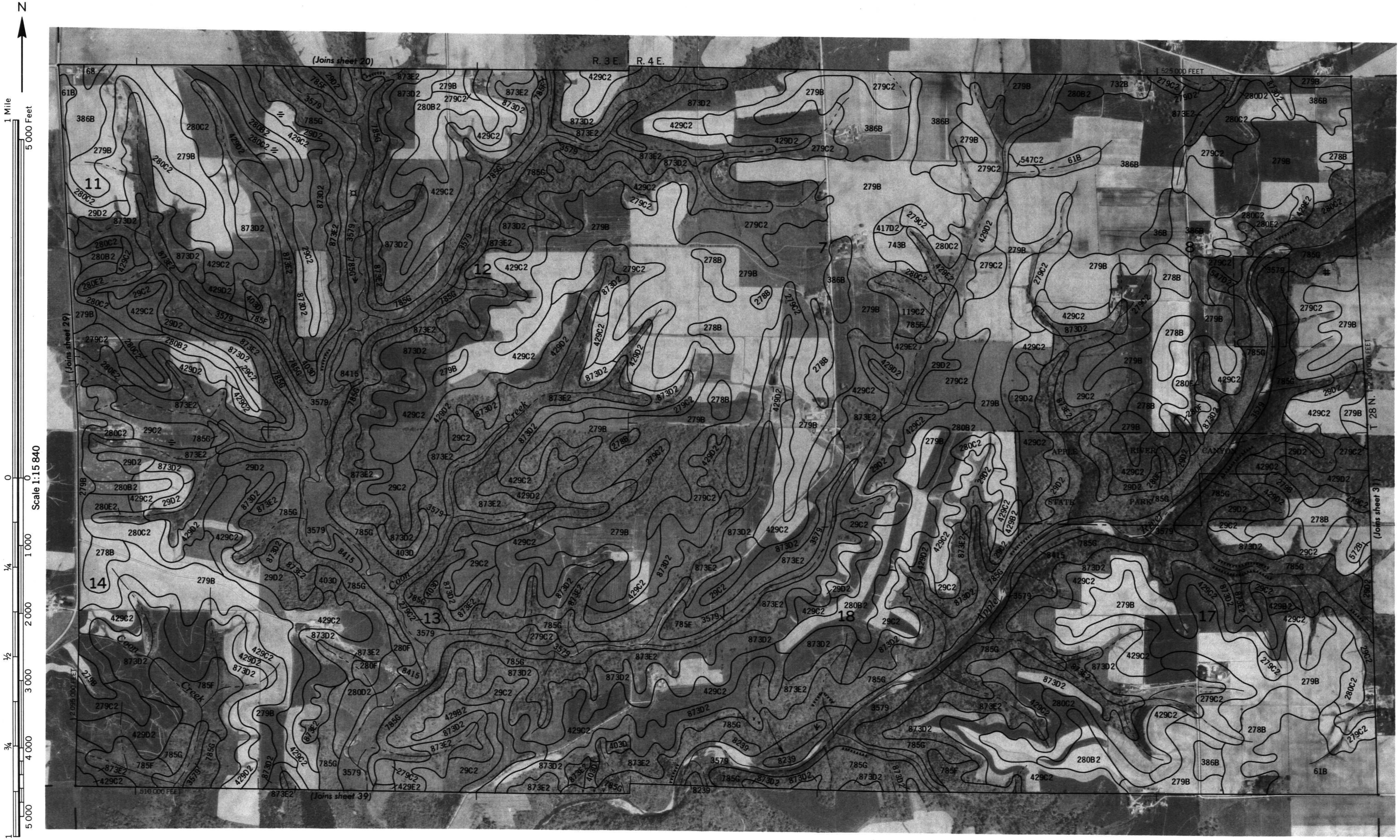
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

3

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 3

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 30



JO DAVIESS COUNTY, ILLINOIS NO. 30

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 31

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 32

JO DAVIESS COUNTY, ILLINOIS NO. 32

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

33

N

Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 33

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

JO DAVIESS COUNTY, ILLINOIS NO. 34

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 35

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 36

JO DAVIESS COUNTY, ILLINOIS NO. 36

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 37

N

1 Mile

5 000 Feet

Scale 1:15 840

0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000

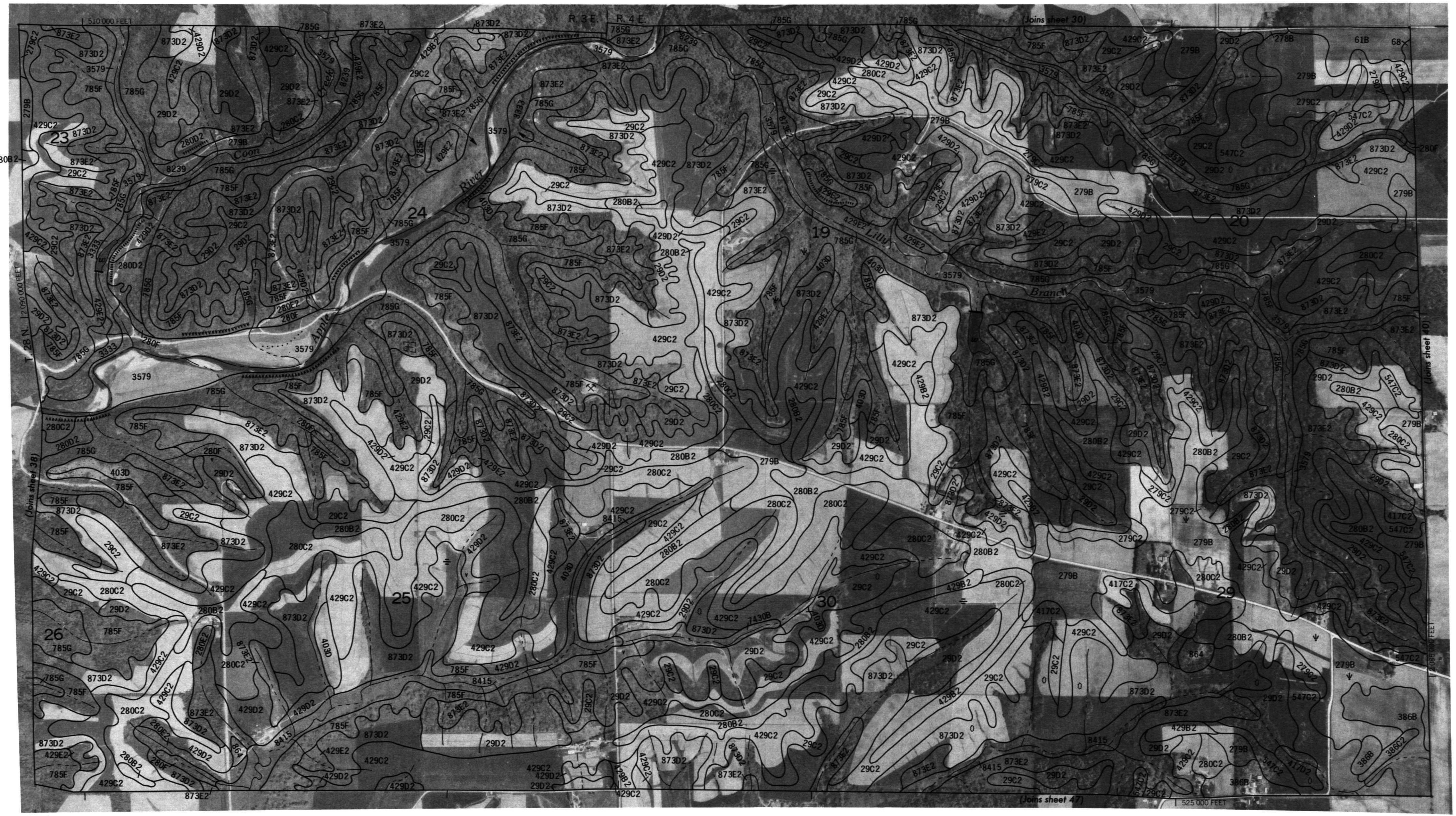
0 — ¼ — ½ — ¾ — 1

JO DAVIESS COUNTY, ILLINOIS NO. 38

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(39)

N



1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 39

4

JO DAVIESS COUNTY, ILLINOIS NO. 4

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

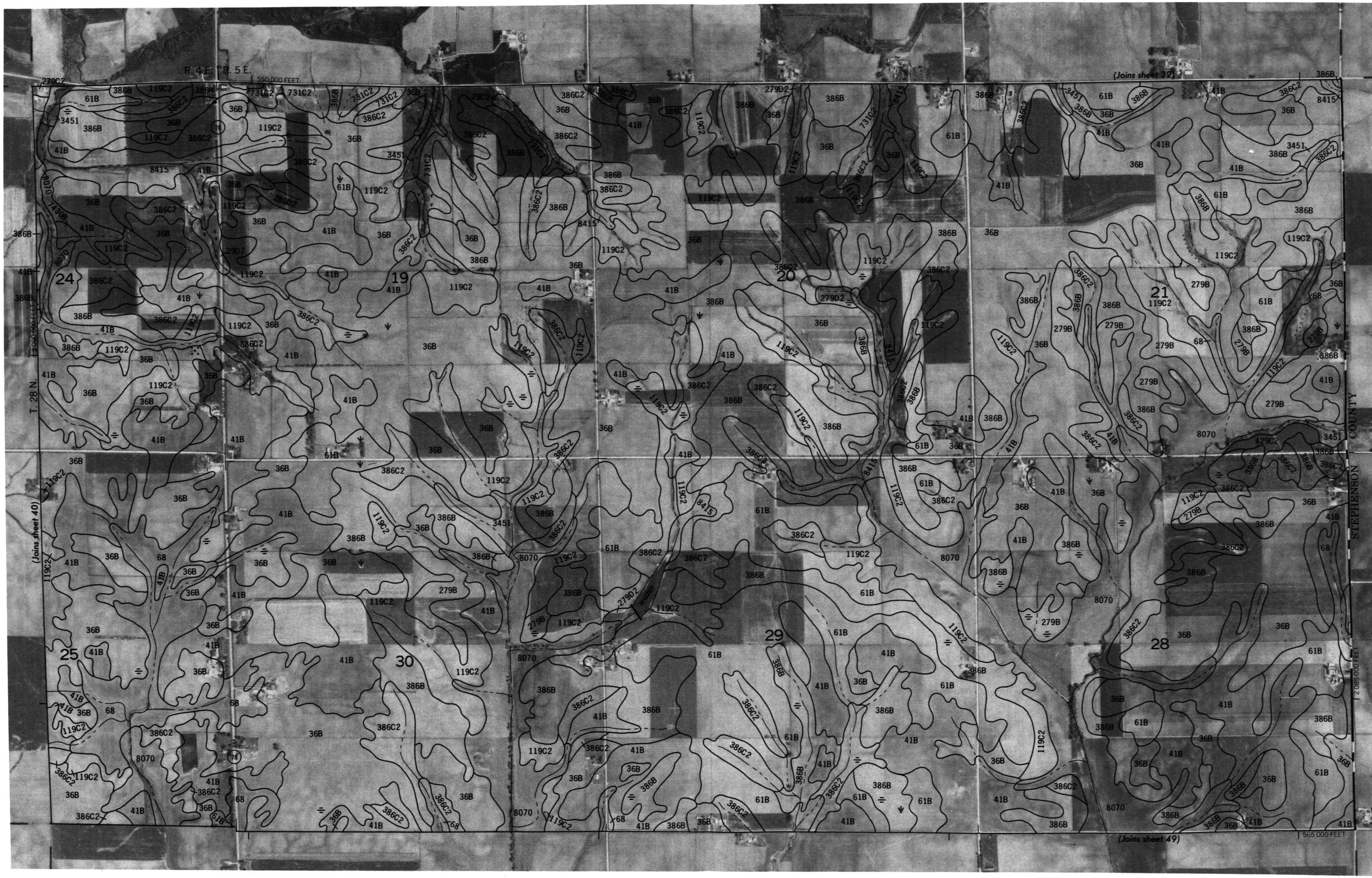
JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 40

JO DAVIESS COUNTY, ILLINOIS NO. 40

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

41

N



Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 41

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 42

JO DAVIESS COUNTY, ILLINOIS NO. 42

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

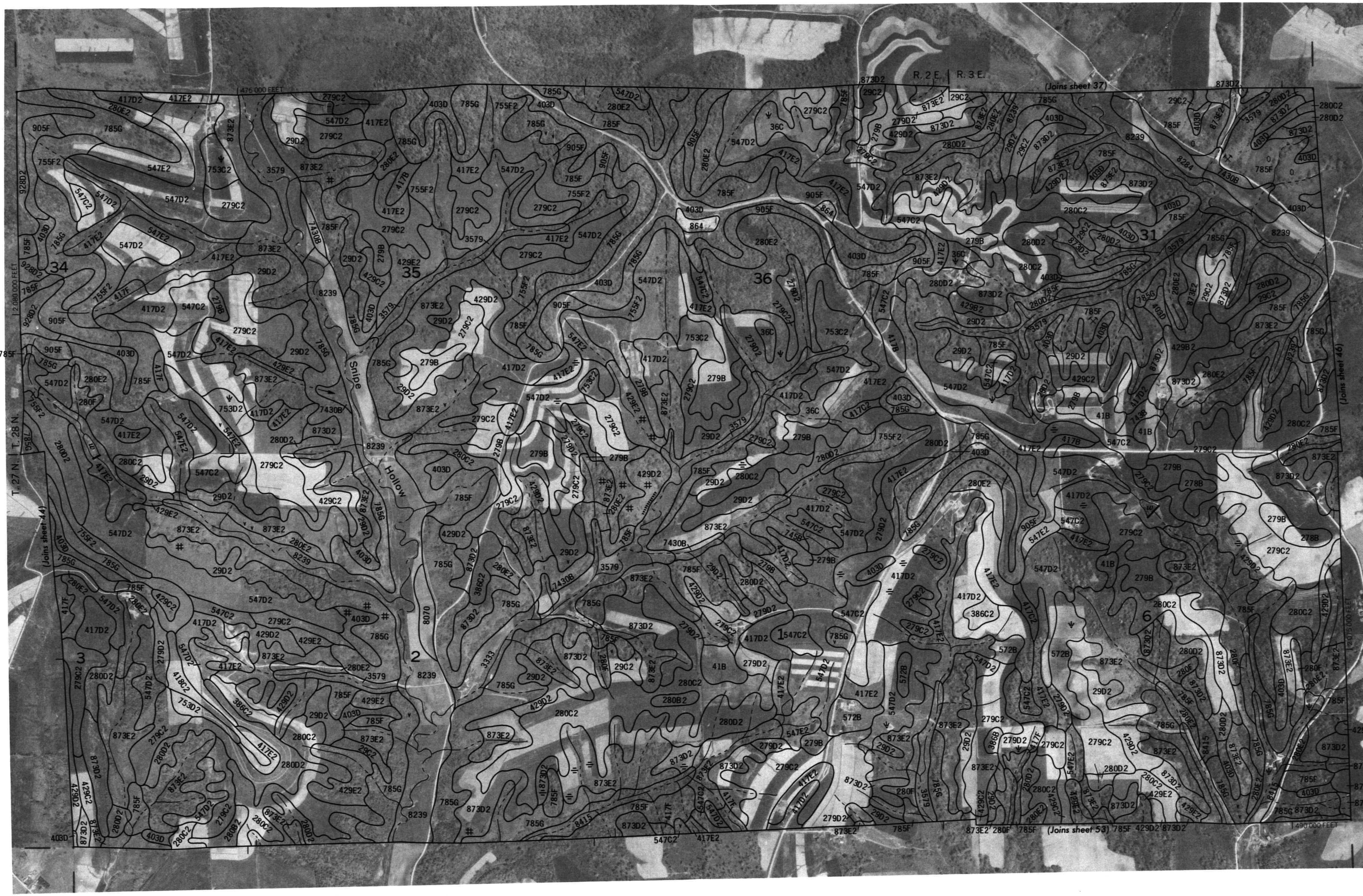
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 43

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 44

JO DAVIESS COUNTY, ILLINOIS NO. 44

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

1 Mile

5 000 Feet

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 45

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 46

JO DAVIESS COUNTY, ILLINOIS NO. 46

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

47

N

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 47

1 Mile | ½ | ¼ | 0 | ¼ | ½ | ¾ | 1

5 000 Feet | 4 000 | 3 000 | 2 000 | 1 000 | 0 | 5 000

Scale 1:15 840

JO DAVIESS COUNTY, ILLINOIS NO. 48

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

49

JO DAVIESS COUNTY, ILLINOIS NO. 49

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 5

N

Scale 1:15 840

1 Mile

5 000 Feet

JO DAVIESS COUNTY, ILLINOIS NO. 50

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

51

N

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

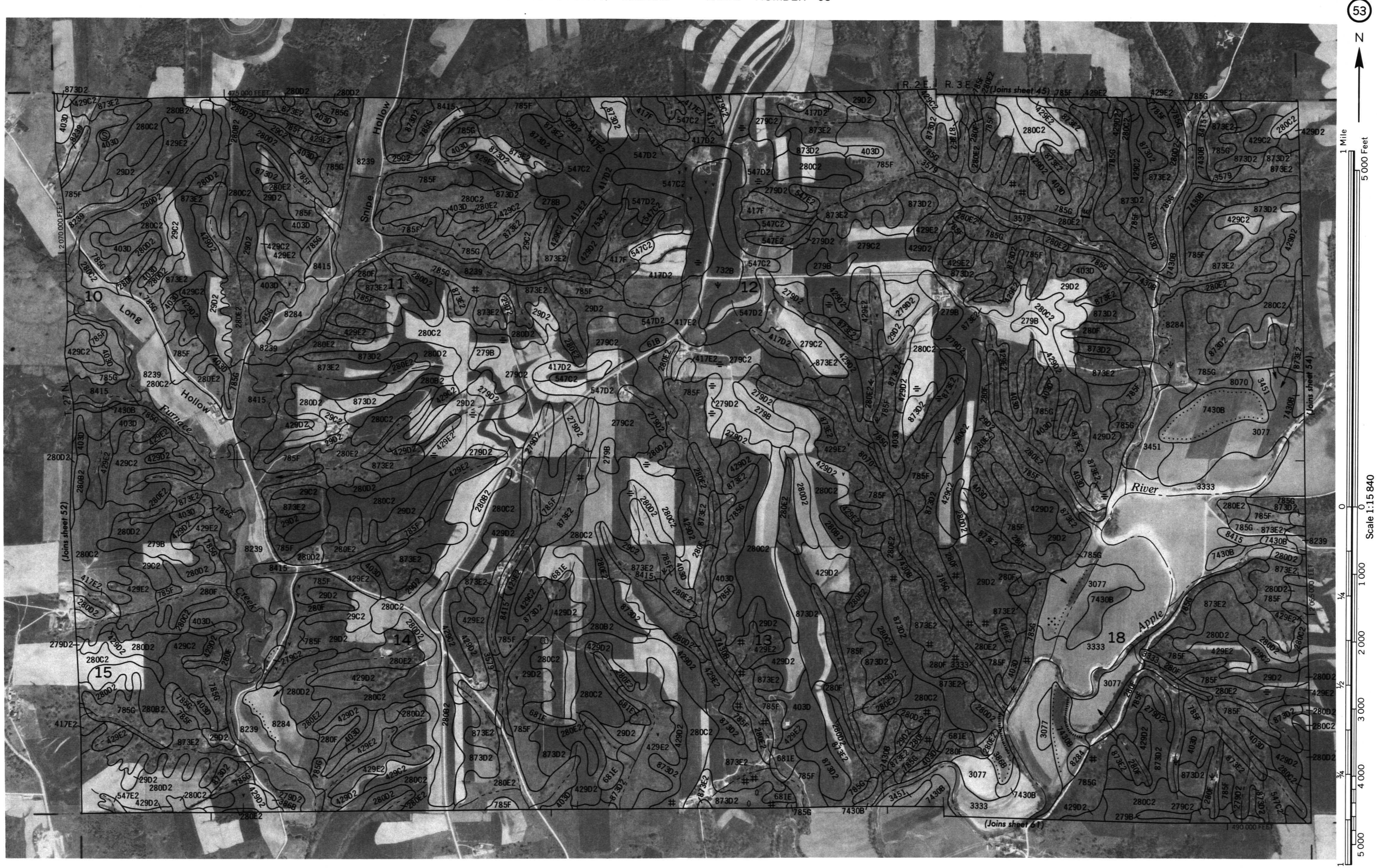
JO DAVIESS COUNTY, ILLINOIS NO. 51

52

N

JO DAVIESS COUNTY, ILLINOIS NO. 52

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 53

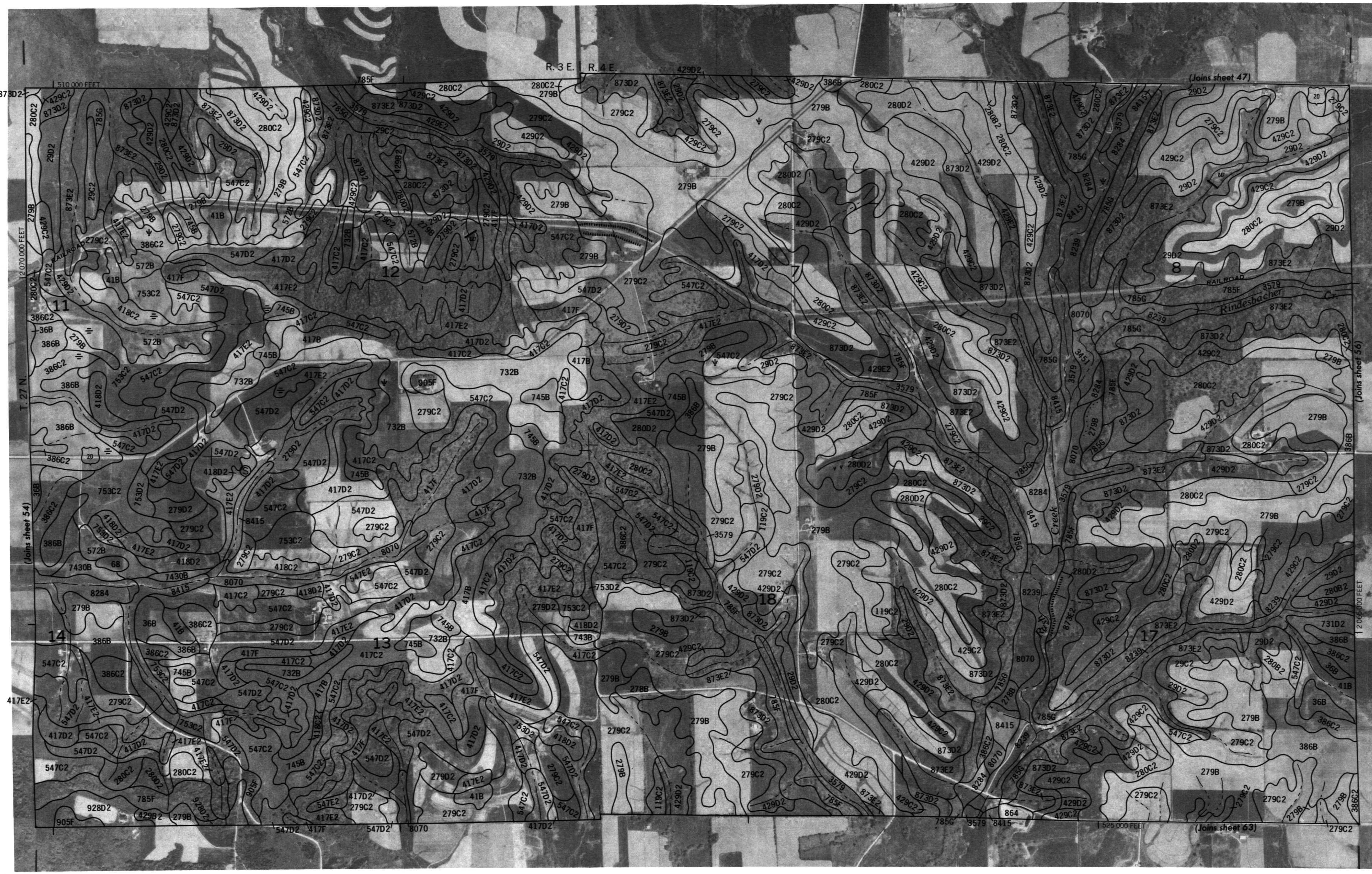
JO DAVIESS COUNTY, ILLINOIS NO. 54

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

55

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 55



N

1 Mile

5 000 Feet

Scale 1:15 840

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾

N

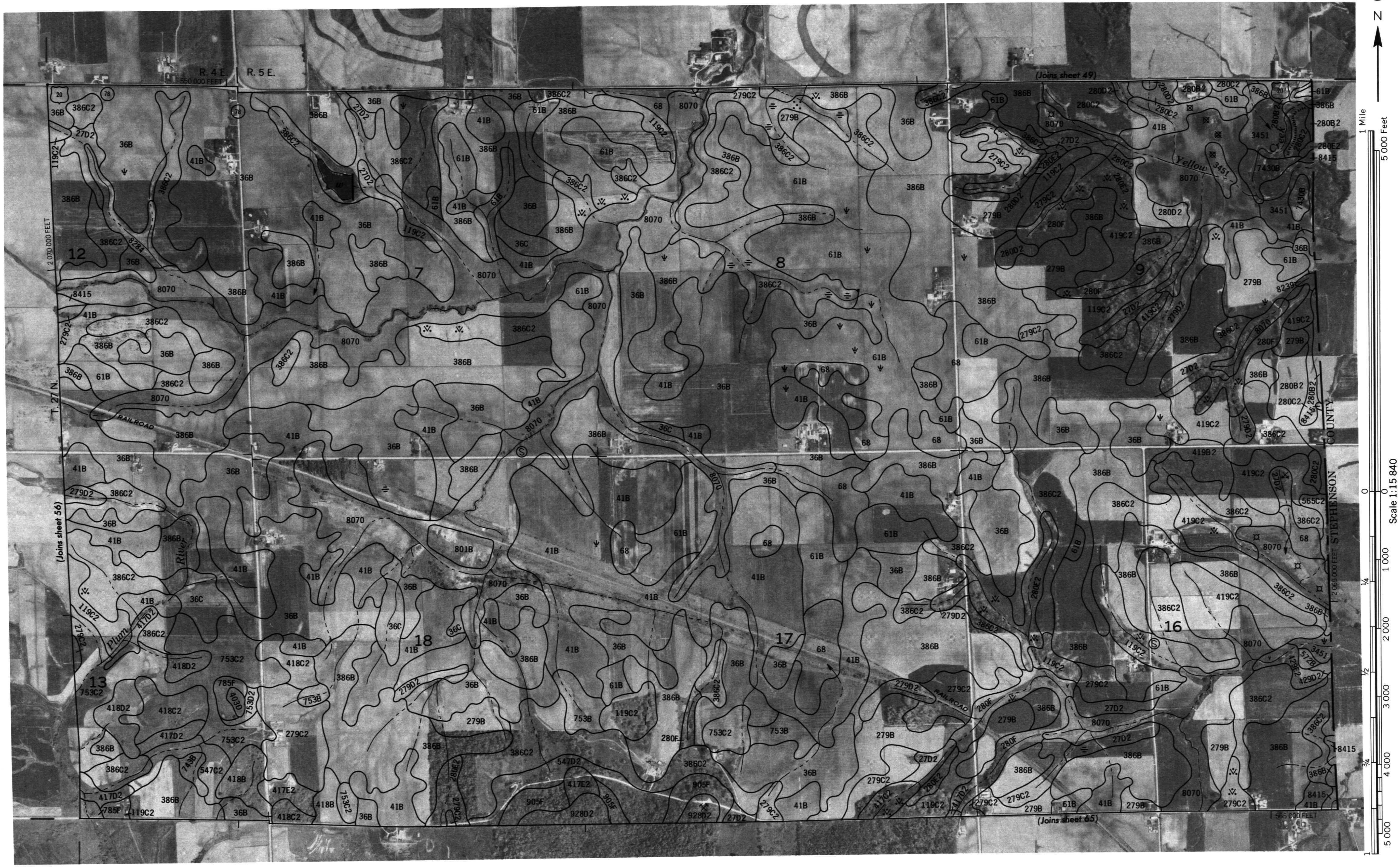
1 Mile

5 000 Feet

Scale 1:15 840

JO DAVIESS COUNTY, ILLINOIS NO. 56

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



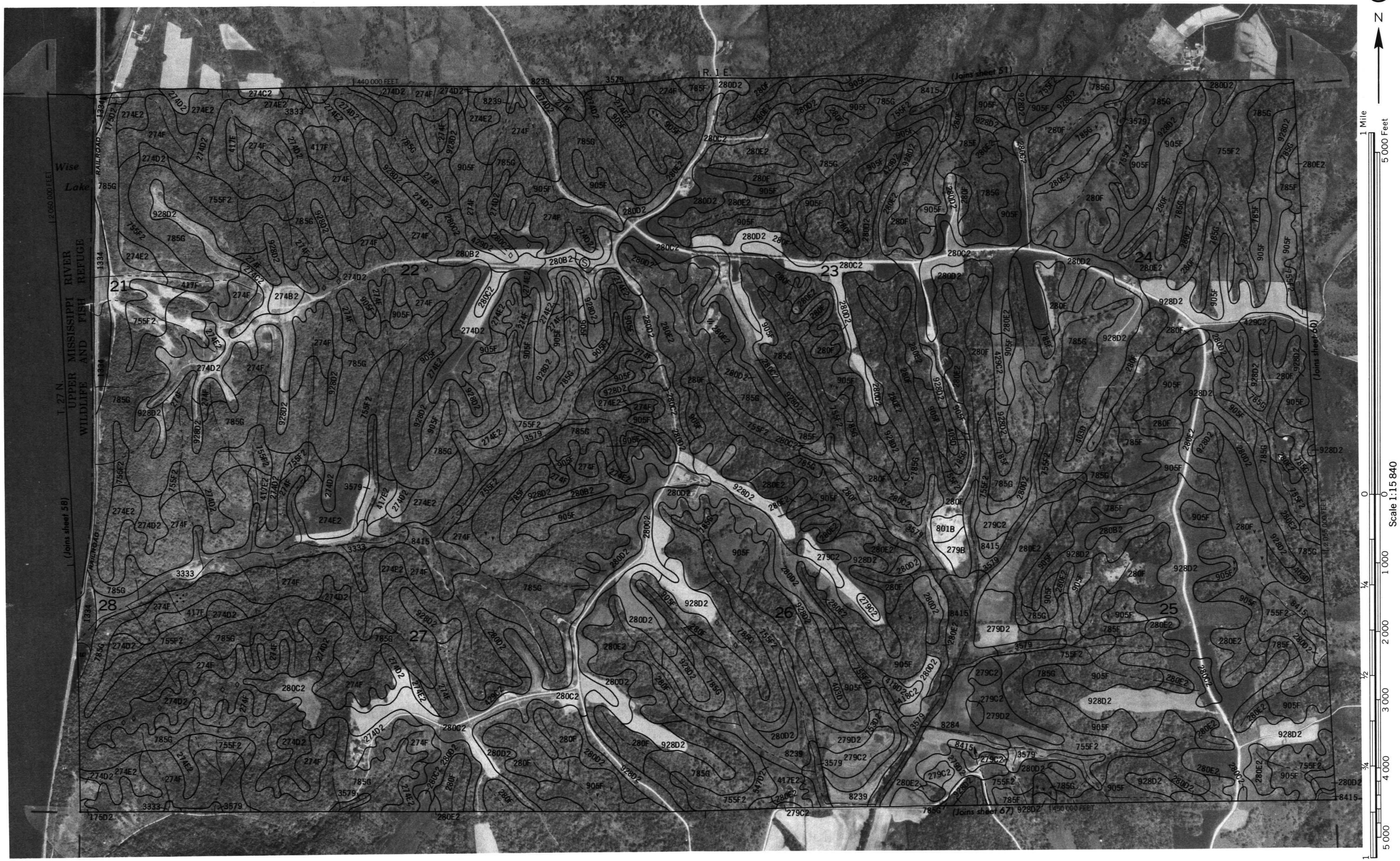
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 57

JO DAVIESS COUNTY, ILLINOIS NO. 58

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

59



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 59

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 6

N

1 Mile
5 000 Feet
Scale 1:15 840

JO DAVIESS COUNTY, ILLINOIS NO. 6

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 60

N

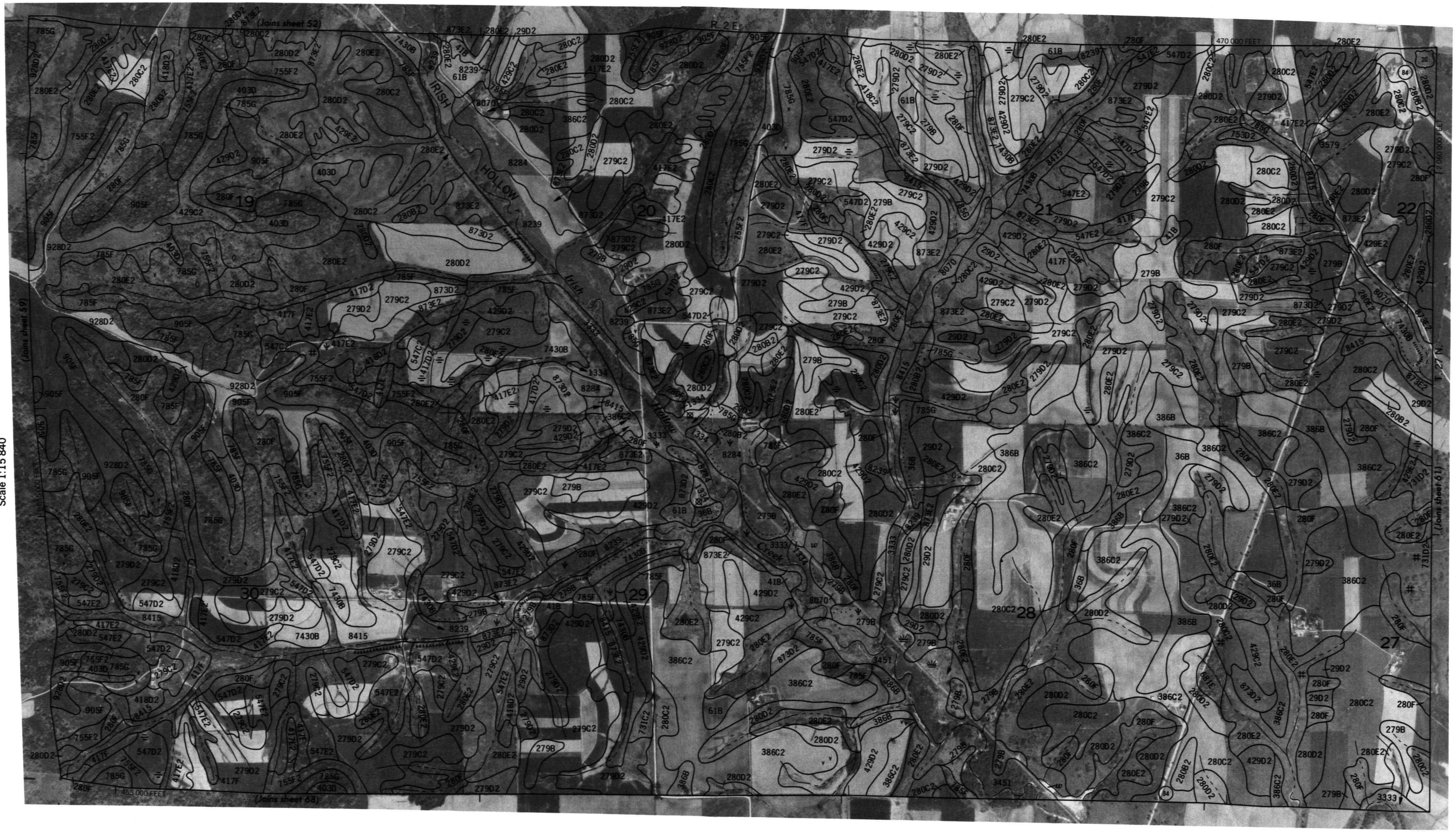
1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

0 ¼ ½ ¾ 1



JO DAVIESS COUNTY, ILLINOIS NO. 60

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 61

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 62

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 63

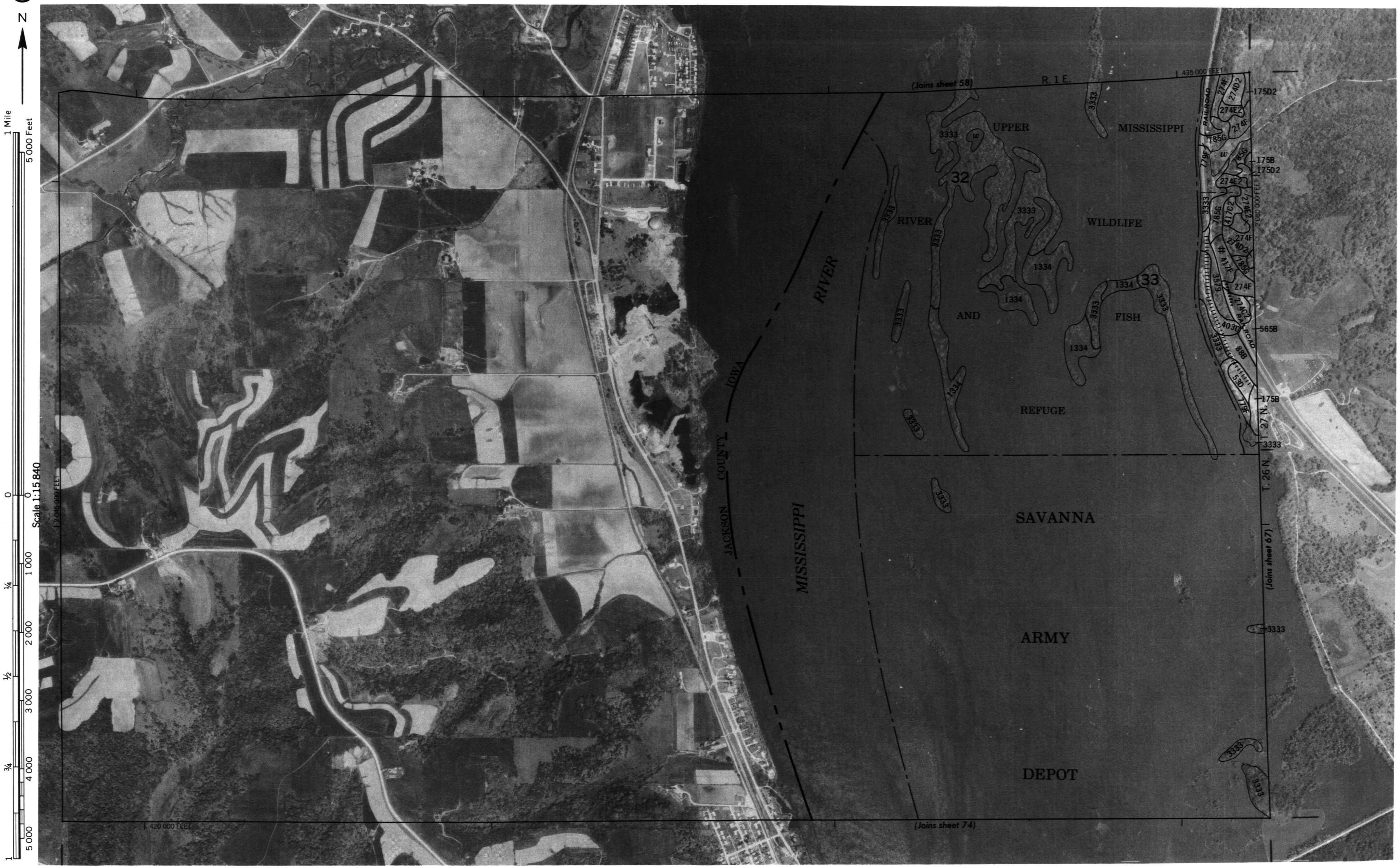
JO DAVIESS COUNTY, ILLINOIS NO. 64

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

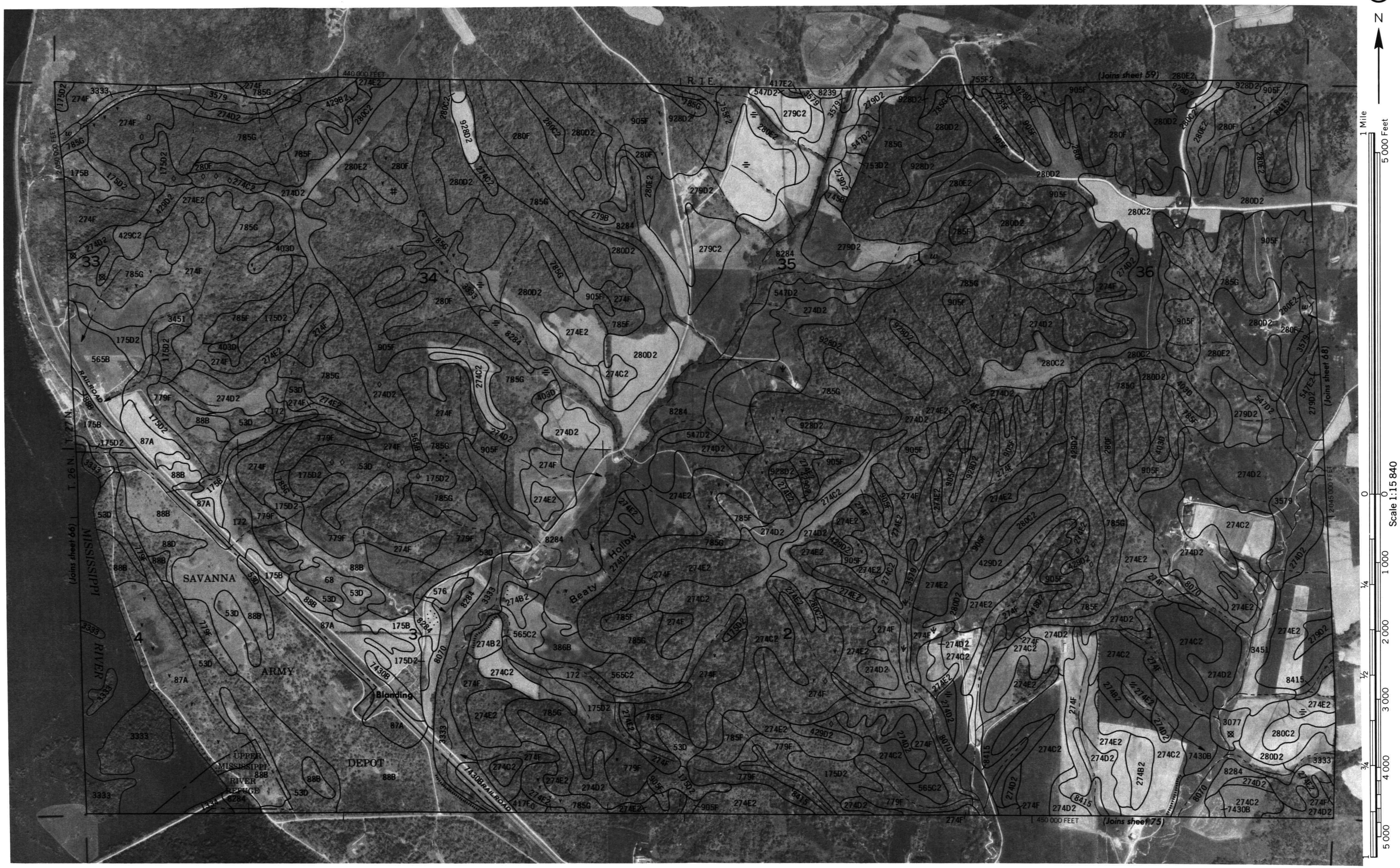
JO DAVIESS COUNTY, ILLINOIS NO. 65

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 66



JO DAVIESS COUNTY, ILLINOIS NO. 66

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

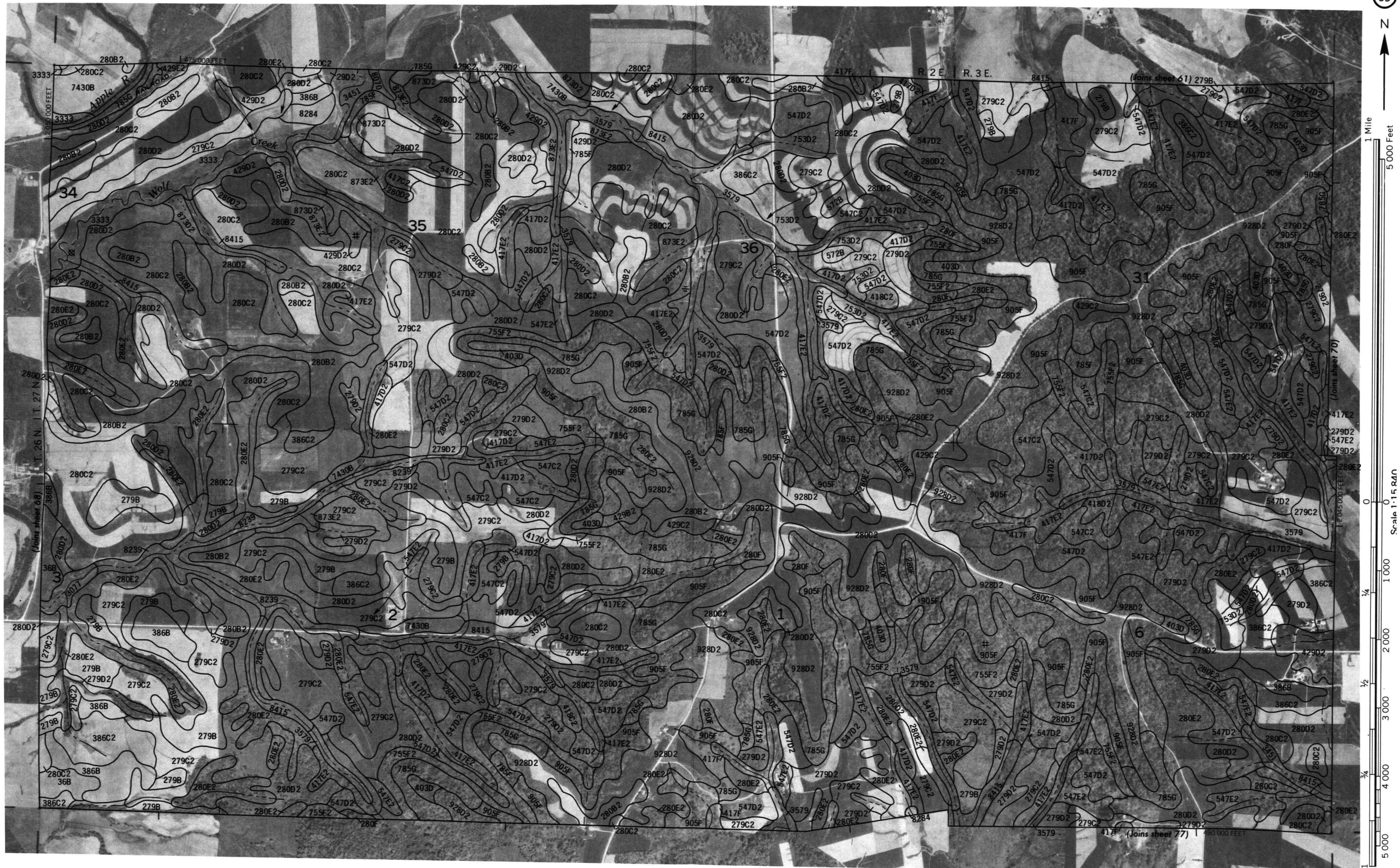
JO DAVIESS COUNTY, ILLINOIS NO. 67

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 68

JO DAVIESS COUNTY, ILLINOIS NO. 68

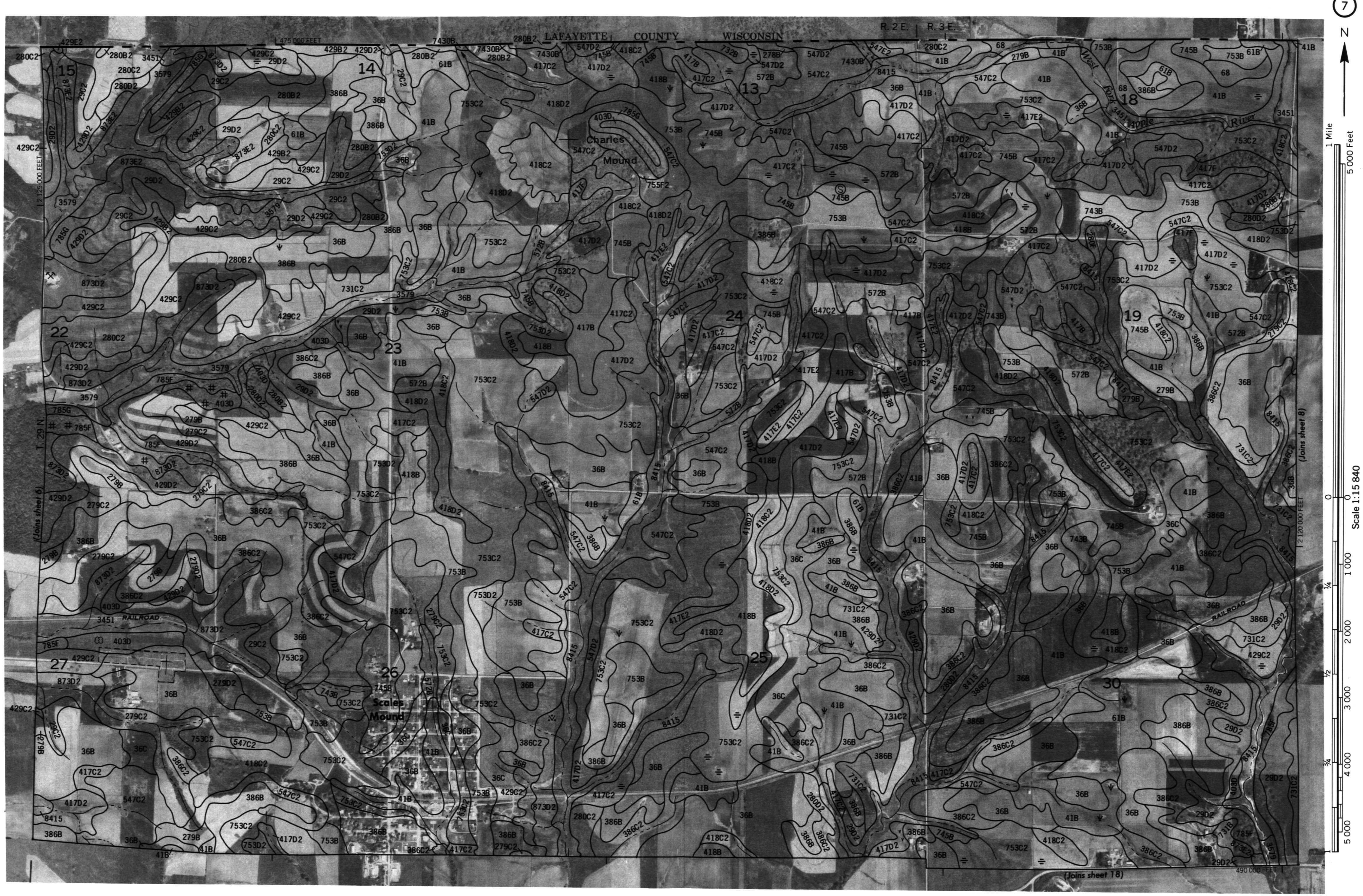
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

69



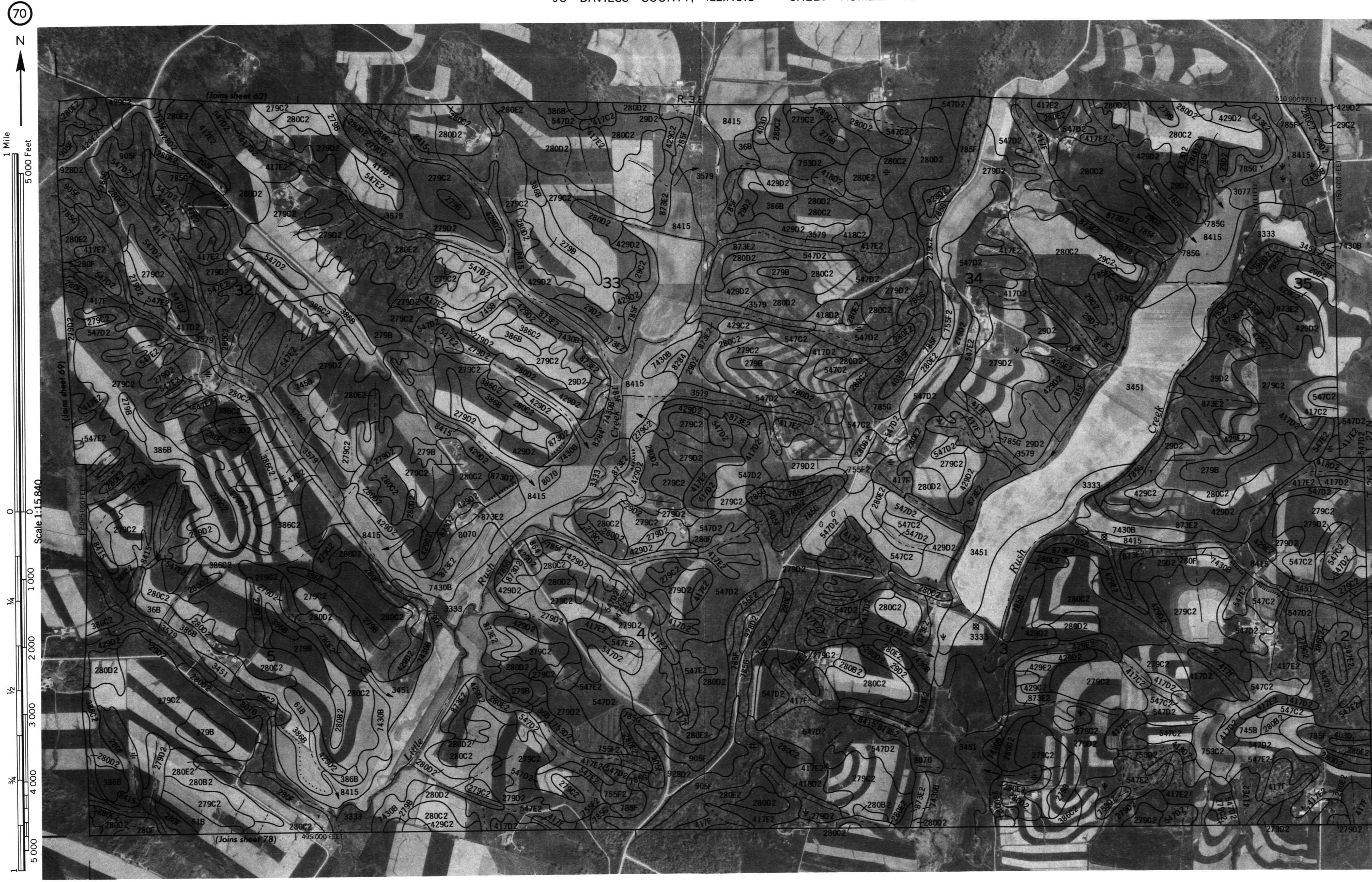
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 69



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 7



JO DAVIESS COUNTY, ILLINOIS NO. 70

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(71)

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 71

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 72

JO DAVIESS COUNTY, ILLINOIS NO. 72

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 73

JO DAVIESS COUNTY, ILLINOIS NO. 74

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 75

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

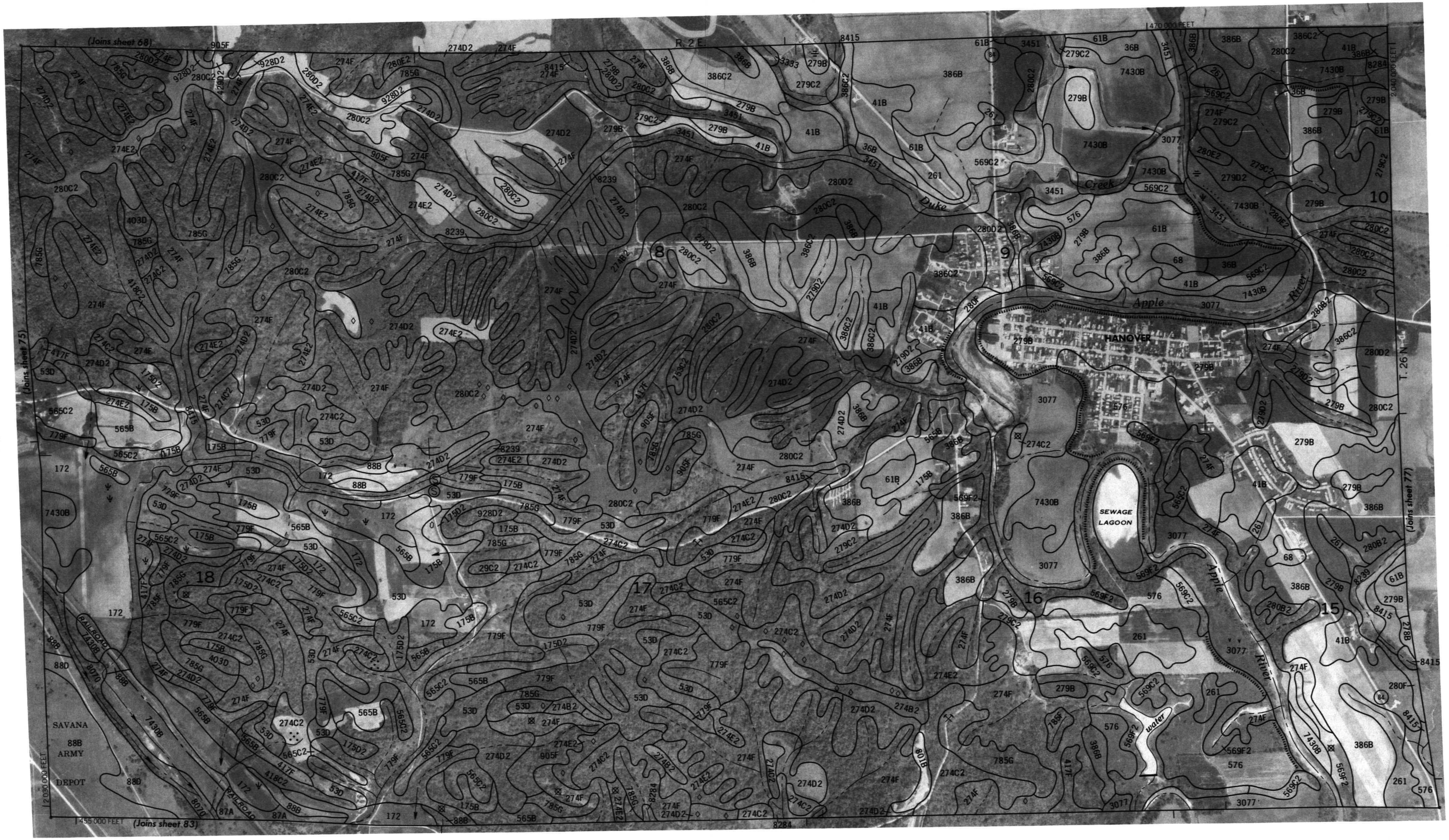
N

1 Mile

5 000 Feet

0

Scale 1:15 840



JO DAVIESS COUNTY, ILLINOIS NO. 76

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

77

N

1 Mile

5 000 Feet

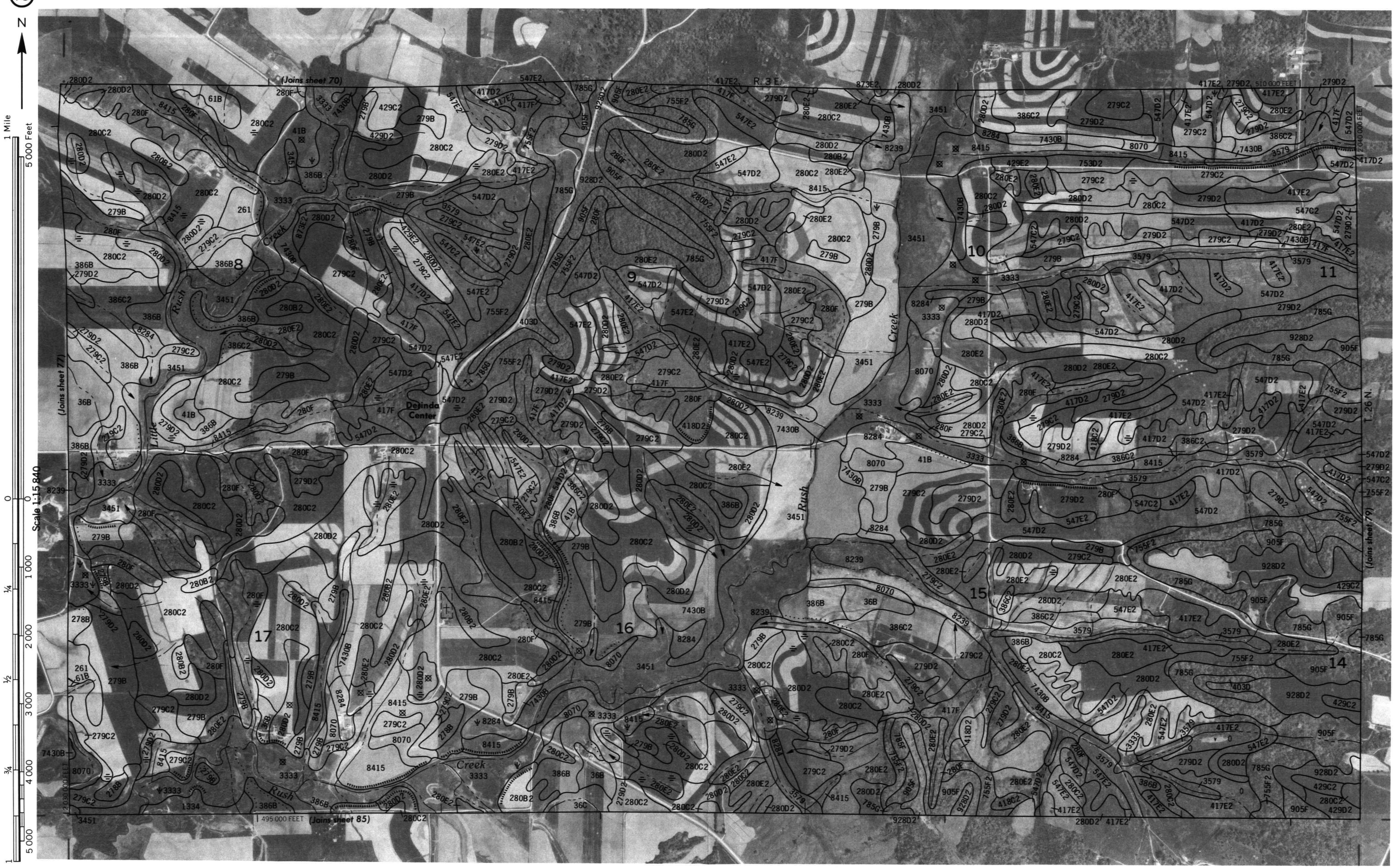
0 — 1/4 — 1/2 — 3/4 — 1

0 1 000 2 000 3 000 4 000 5 000

Scale 1:15 840

JO DAVIESS COUNTY, ILLINOIS NO. 77

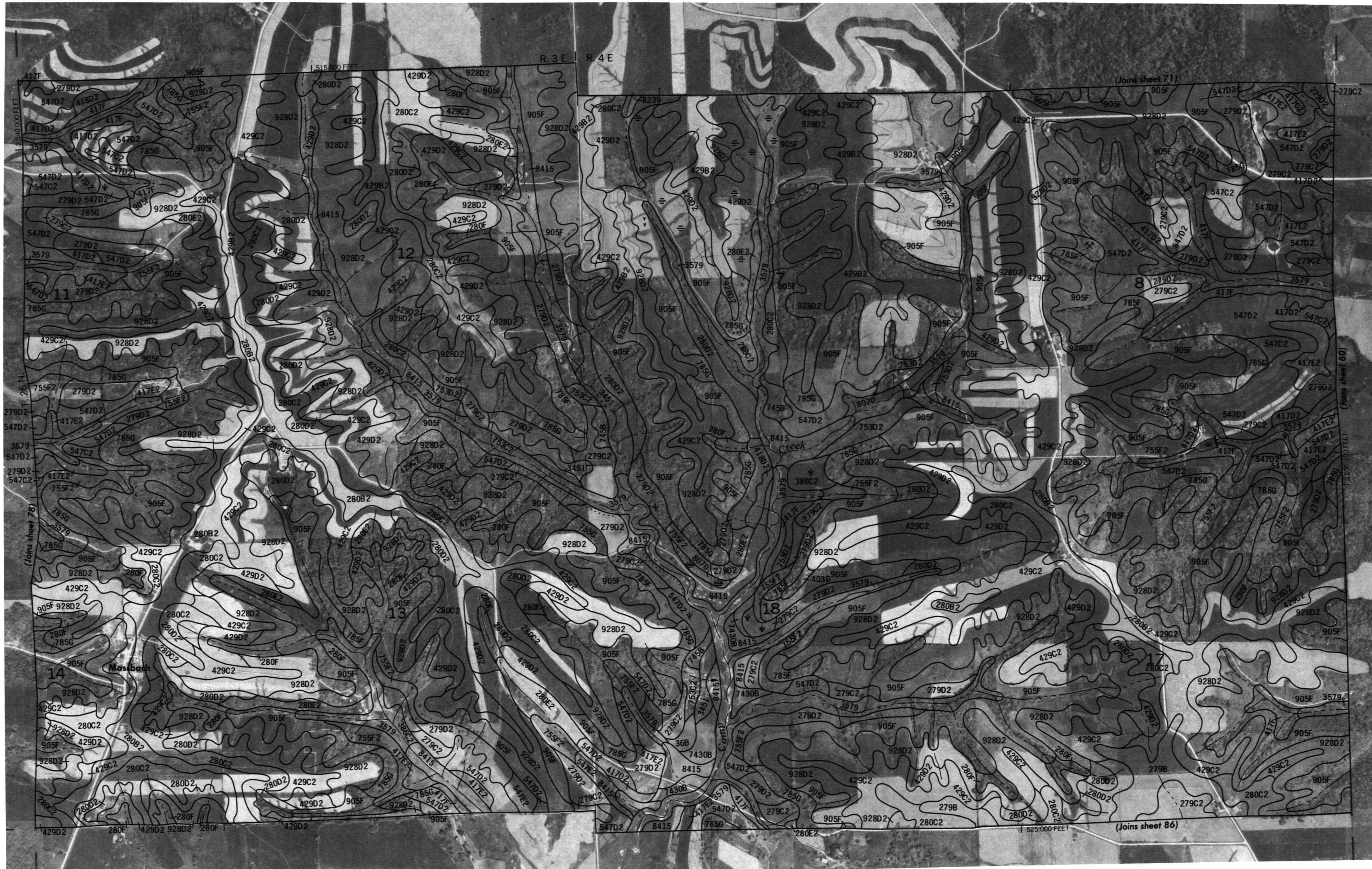
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



JO DAVIESS COUNTY, ILLINOIS NO. 78

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

79



N

Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 79

JO DAVIESS COUNTY, ILLINOIS NO. 8

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 80

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 81

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 82

JO DAVIESS COUNTY, ILLINOIS NO. 82

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

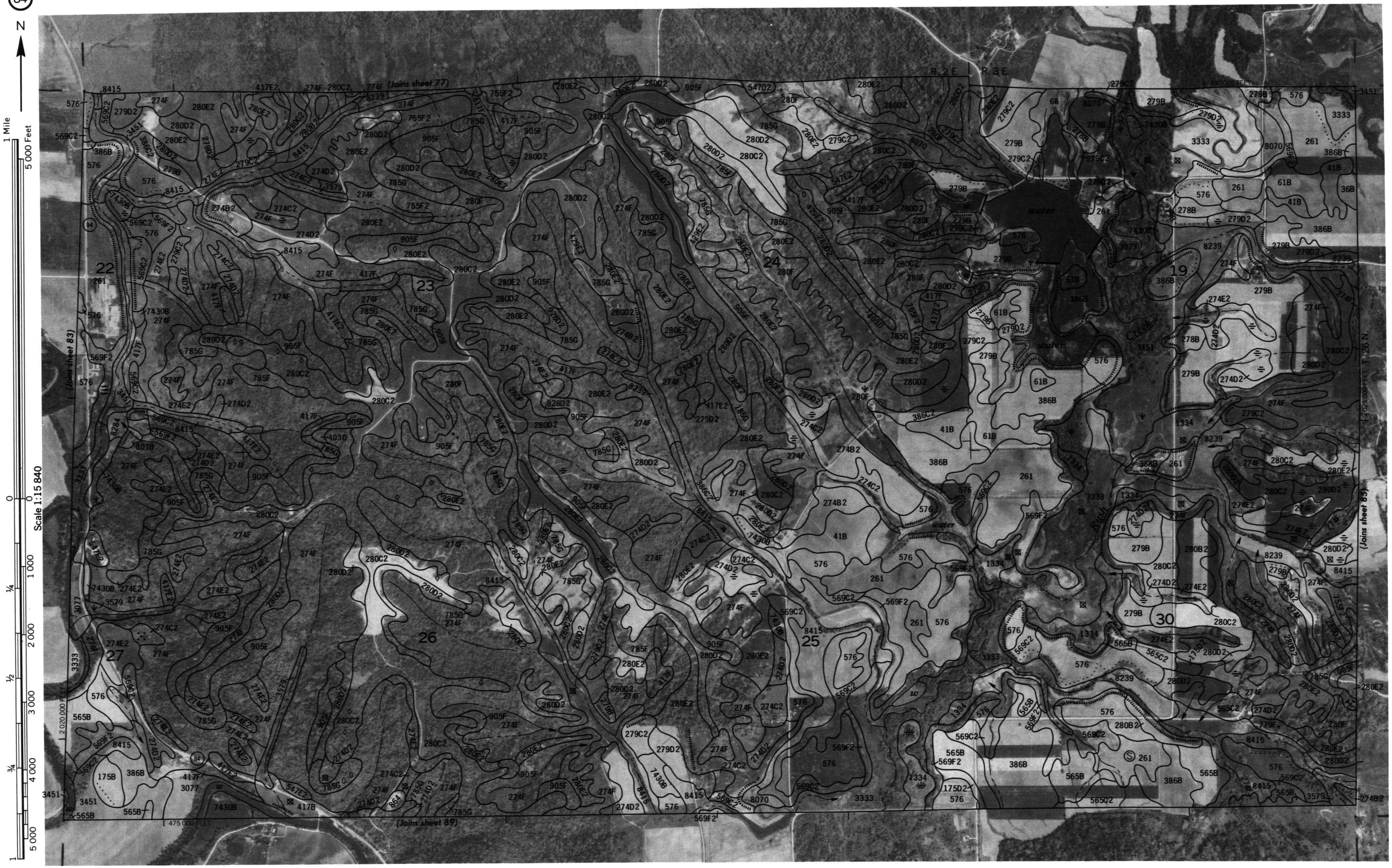
5 000 Feet

Scale 1:15 840

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 83

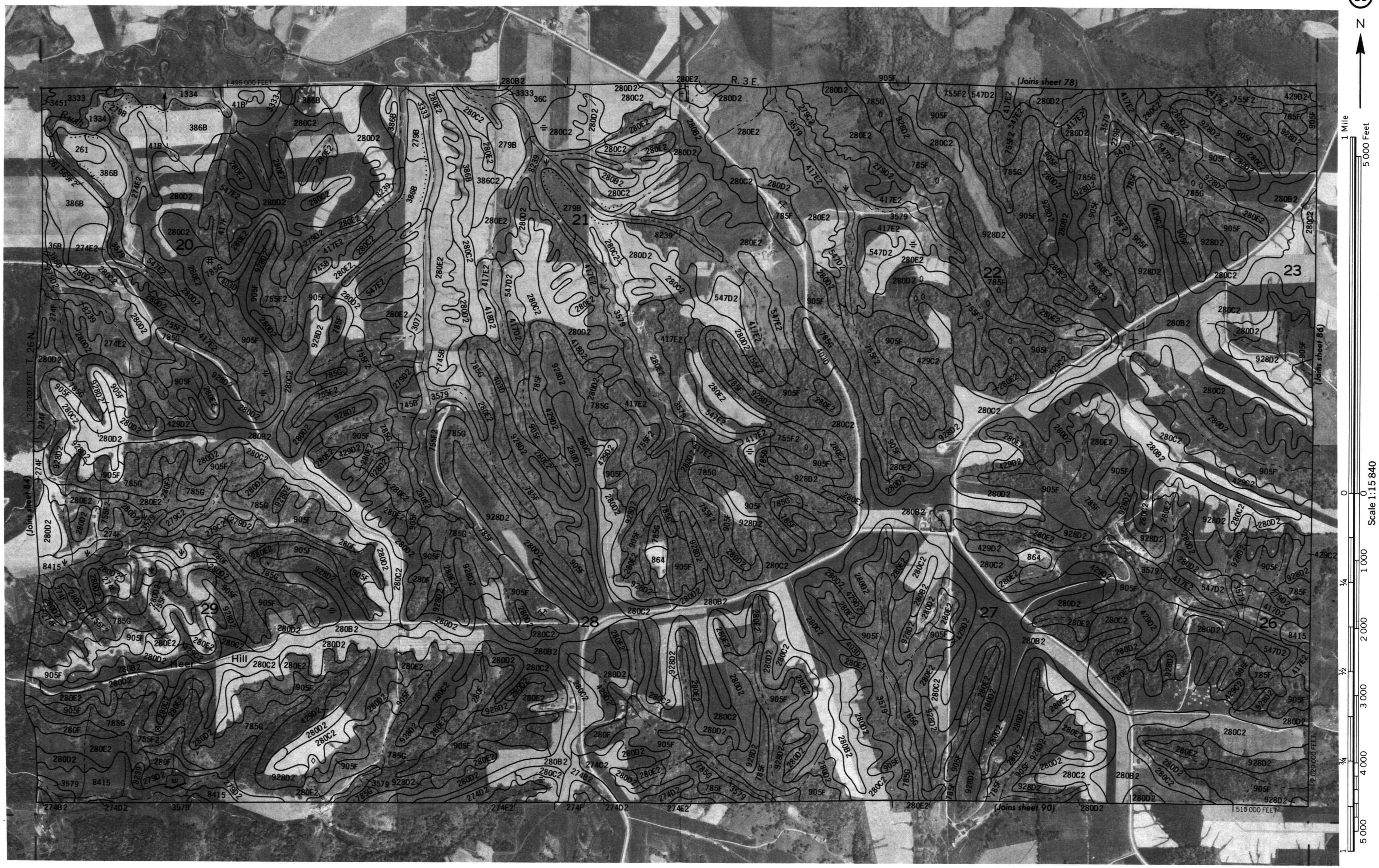
JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 84



JO DAVIESS COUNTY, ILLINOIS NO. 84

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

85



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS — SHEET NUMBER 86

JO DAVIESS COUNTY, ILLINOIS NO. 86

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

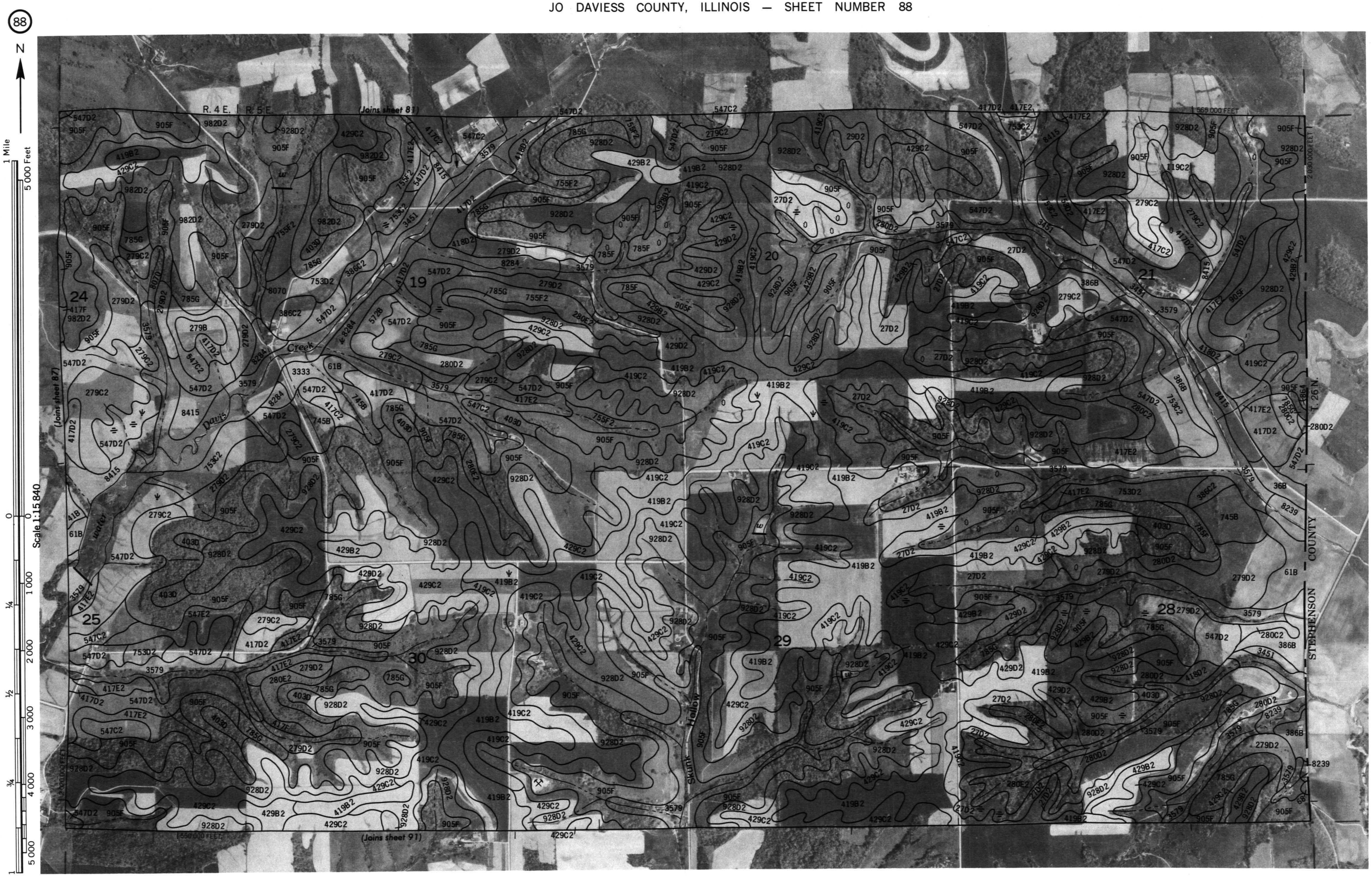
87

N

1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 87

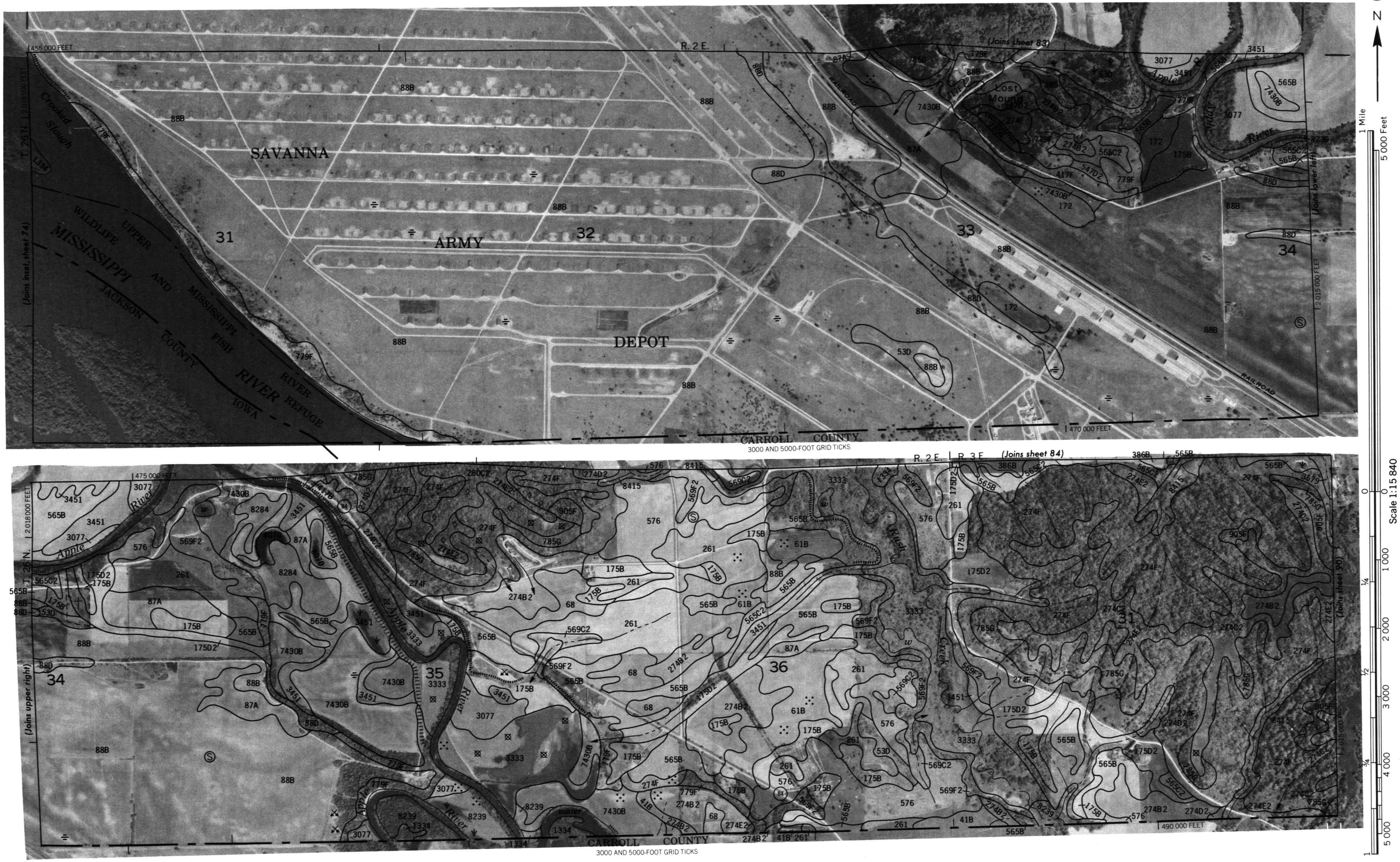


JO DAVIESS COUNTY, ILLINOIS NO. 88

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 89

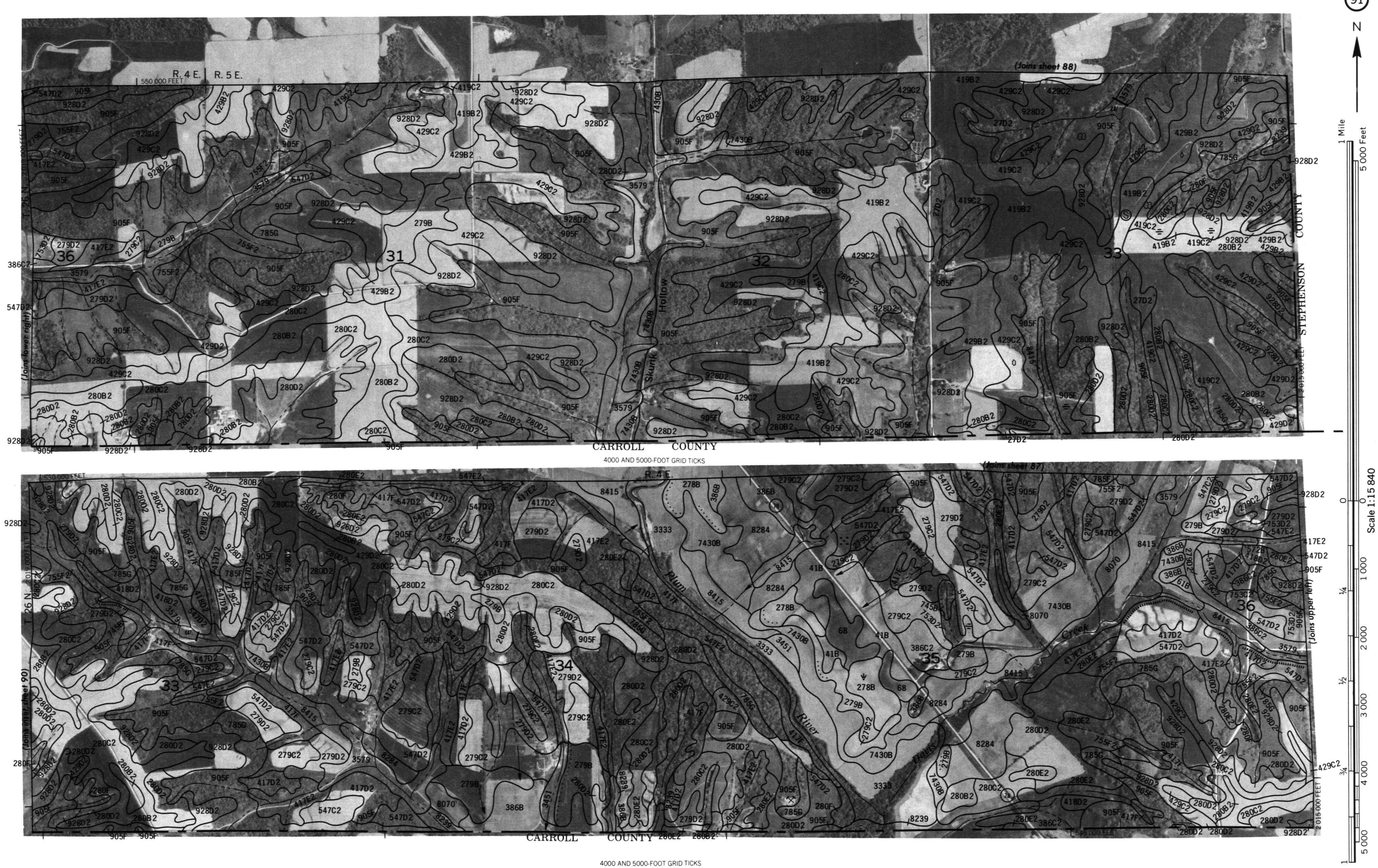


This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 9

JO DAVIESS COUNTY, ILLINOIS NO. 90

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JO DAVIESS COUNTY, ILLINOIS NO. 91